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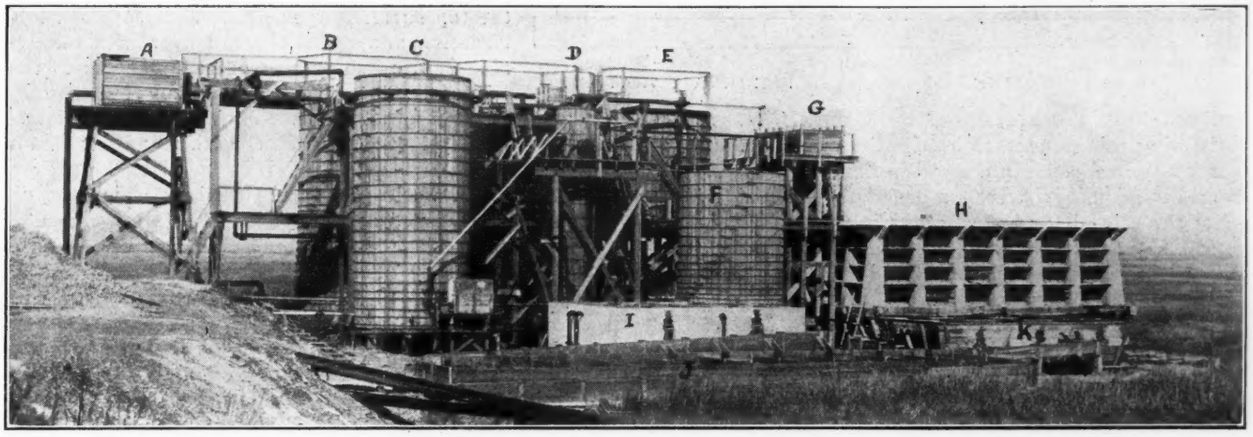


GENERAL VIEW OF EXPERIMENTAL SEWAGE DISPOSAL PLANT.
A—Quieting tank. B—Deepest Imhoff tank. C—Aerating tank. D—Aerating siphon. E—Shallowest Imhoff tank. F—Aerating sprinkling filter. G—Dosing tanks for sprinkling filters. H—Sprinkling filters. I—Individual settling tanks. J—Sludge drying beds. K—Sprinkling filter settling tanks.

EXPERIMENTAL SEWAGE DISPOSAL PLANT

At Brooklyn, New York—Includes Imhoff Tanks, Aerati ng Tank, Aerating Siphon, Aerating Filters, Sprinkling Filters, Settling Tanks, Sludge Beds, Sludge Digesting Tank, and Riensch-Wurl Screen—Construction Details.

About a year ago we gave a brief description of a plan for a sewage disposal plant to be built at Brooklyn, N. Y., for conducting experiments on a working scale. That plant has now been substantially completed and partial operation has been going on for several weeks in the nature of a trying out of the several elements. While analyses have been made of the sewage and the effluents at various points, this was done up to January 1, 1914, chiefly in connection with the checking of the meters, measuring devices, calibrations and sizes of units and the formulating of systematic plans for carrying on the experiments. In general, the construction plans were carried out as designed, although there have been some minor modifications and additions.

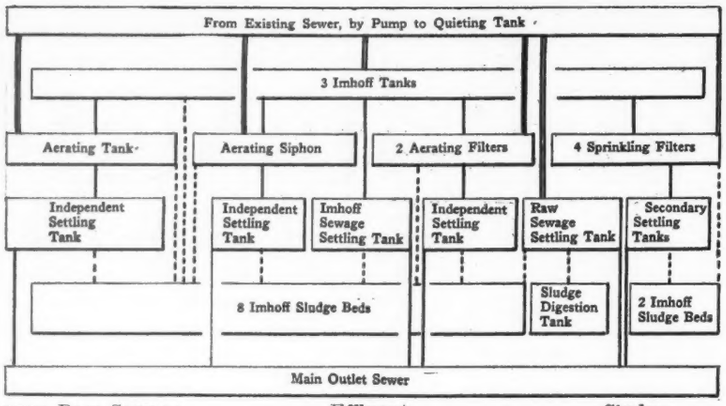
A combined sewer serving the 26th Ward of Brooklyn passes the site of this disposal plant, and all the sewage used in the plant will be pumped from this sewer to a quieting tank, from which it may pass by gravity to any one or more of twelve other appliances—three Imhoff tanks of different depths, an aerating tank, an aerating siphon, two aerating filters, four sprinkling filters and a raw sewage settling tank. The effluent from the three Imhoff tanks will be led to any one or more of the above named appliances, except the raw sewage settling tank, or it may be led to an Imhoff sewage settling tank. Thus either raw sewage direct from the quieting tank or Imhoff tank effluent may be used in the various experiments.

The effluent from the aerating tank and siphon is led in each case to an independent settling tank connected with the unit in question, while the effluent from the two aerating sprinkling filters and the four sprinkling filters is led to secondary settling tanks, each filter having its own tank. The effluent from each of these independent settling tanks, from the Imhoff sewage settling tank, from the raw sewage settling tank and from the secondary sprinkling filter settling tanks, all passes to the main outlet sewer.

There are ten Imhoff sludge beds, eight of which receive the sludge from the three Imhoff tanks, from the raw sewage settling tank and the settling tanks which receive the effluent from the aerating tank and aerating siphon, and also from the Imhoff sewage settling tank. The sludge from the raw sewage settling tank may be led either to the Imhoff sludge beds or to a special sludge digesting tank, an air-tight tank of steel. The sludge from the six secondary sprinkling filter settling tanks is treated on the other two Imhoff sludge beds. This gives 33 separate tanks and beds.

There will be added later a Riensch-Wurl screen and an appliance for testing the vacuum method of sewage filtration. In addition there will be tests of the disinfection of sewage and of effluents from the various treatments. These tests are considered of special importance in their relation to the shell fish industry.

While not directly connected with sewage treatment, there will also be carried on at this station some storm water studies to determine the relation between rainfall



Raw Sewage. —— Effluent. ····· Sludge.

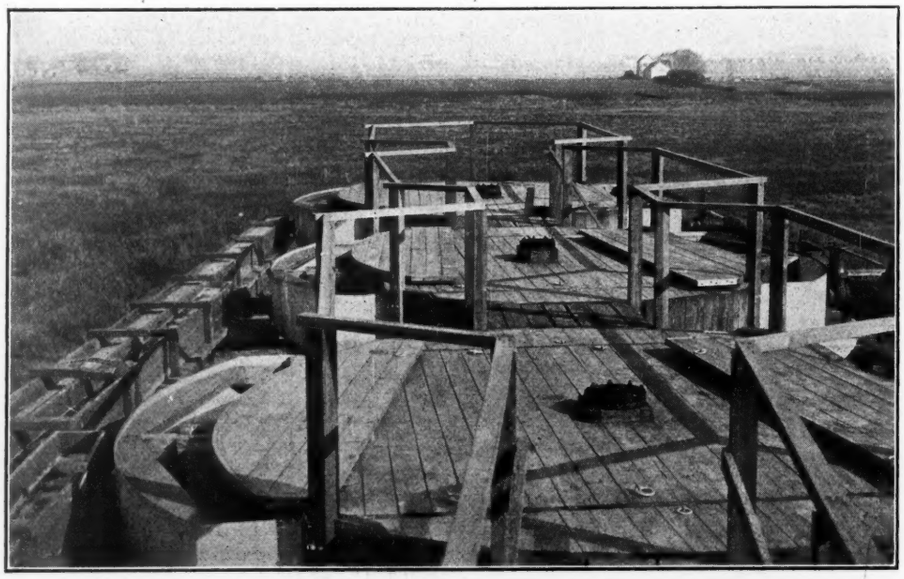
DIAGRAM SHOWING SEQUENCES IN USE OF APPARATUS.

and runoff in this section of New York City. A self-registering rain gauge has been set up on the roof of the laboratory, which is on meadow land a long distance from any buildings, trees or other objects which might affect the rainfall, and the sewage in the combined sewer outfall which flows by the station will be measured. Other rain gauges will be installed in various parts of the drainage area, and sewage flow gauges will be placed at the main points of concentration. Studies will be made to determine the effect of the storm flow on the sewage to be treated and how much of the storm flow will have to be treated as sewage.

The quieting tank, which is mounted on a tower about 20 feet high, is a box of 2½-inch pine about 12 feet by 8 feet 6 inches and 5 feet deep, which contains two baffles, one extending 3½ feet up from the bottom, followed by another extending 4 feet down from the top. Sewage is admitted behind the former baffle through an 8-inch pipe leading from the pump, which enters the box about a foot above the bottom. At one side of the tank, beyond the second baffle, is a weir four feet above the bottom, which maintains a constant head at this point. In the face of the tank farthest from the inlet pipe are six outlet openings, each leading into its own trough or flume, which openings are provided with regulating nozzles. A constant head being maintained by the weir, any desired flow can be obtained by placing the proper size of orifice in these regulating nozzles, thus controlling the amount of flow to each of the six flumes. These six flumes lead to the six kinds of tanks referred to in the second paragraph.

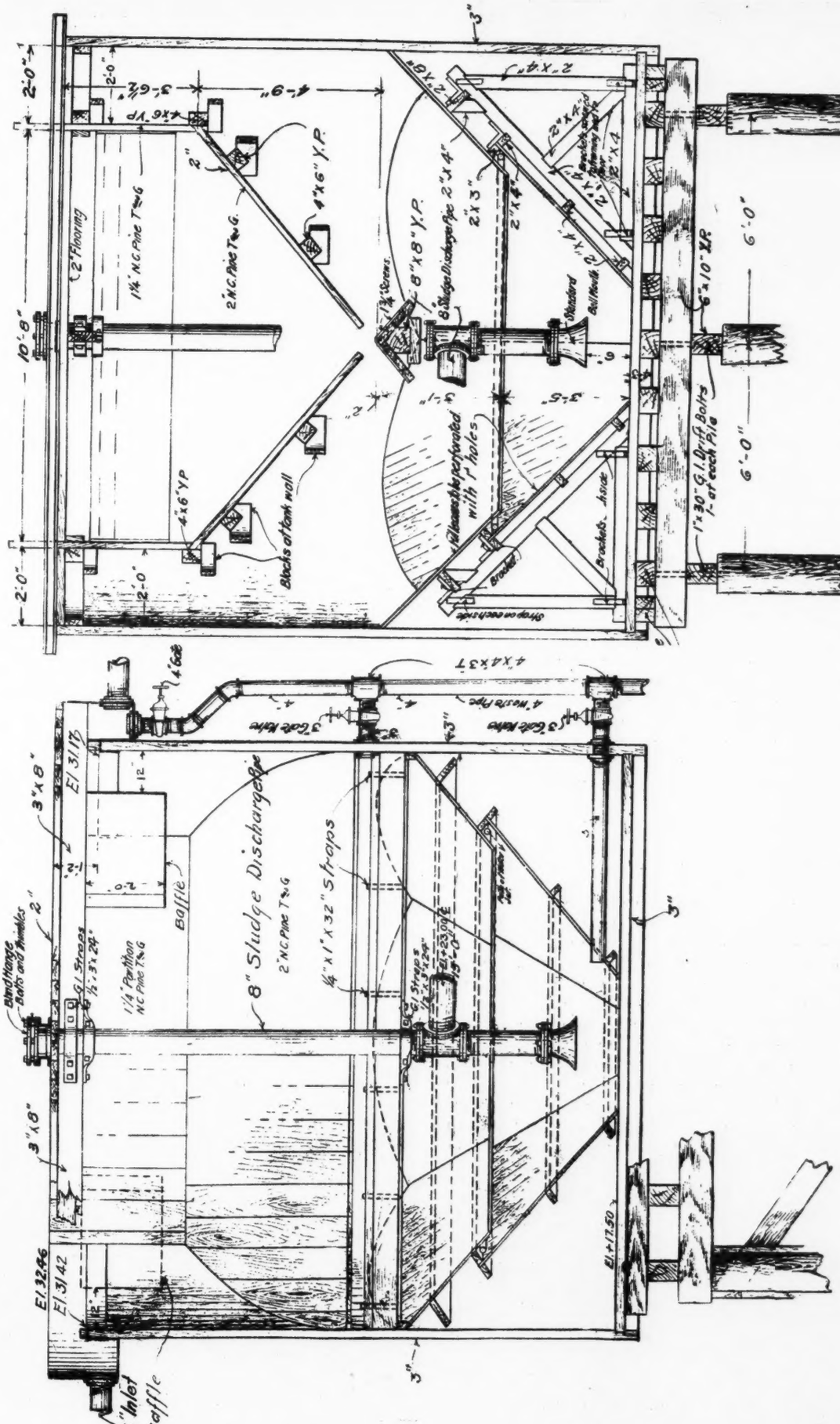
The three Imhoff tanks differ from each other practically only in depth. The plan shown herewith is that of the shallowest tank, which is 15 feet 6½ inches in total depth, while the next largest is 23 feet 9 inches deep, and the deepest of the three is 30 feet 8 inches. The upper or sedimentation section is composed of two parallel vertical straight sides of 1¼-inch t. and g. pine, giving a clear space of 10 feet 8 inches between sides and a maximum of 2 feet between each of these and the outer shell of the tank, the latter spaces serving as gas outlets and for breaking up the scum. The bottom of this sedimentation chamber is formed of two inclines of 2-inch pine set at an angle of 45 degrees. These inclined floors do not lap one by the other, as is perhaps the more common practice, but the gas is diverted from the slot by a triangular shaped construction of wood placed directly beneath it. The vertical walls of this sedimentation tank are 3 feet 6½ inches deep in the shallowest tank, 6 feet 7 inches in the middle size and 10 feet 6 inches in the deepest tank. The last named rests directly upon piles at the level of the ground, while the other two are raised upon pile trestles, the top surfaces of all three being at the same elevation and being planked over with removable flooring so as to give ready access to the top of the tank for breaking up scum, cleaning out the sludge pipe, etc. The sludge pipe is extended vertically to the top of the tank to permit cleaning out, the top being closed by a plate bolted on to a flange. A waste pipe is provided by which the effluent can be wasted at the overflow, or sewage can be drawn from the bottom or from mid depth of the tank. The bottom of the digesting chamber is in the form of a truncated hexagonal pyramid, made in two overlapping sections with a perforated water pipe between them for washing the sludge to the bottom. The sewage enters and leaves the tank over weirs, with a baffle 12 inches in front of each, all of which extend entirely across the sedimentation tank.

The purpose of the aerating tank is to determine the effect of forced aeration upon both crude sewage and Imhoff tank effluent. It consists of a tank having 12 feet inside diameter and 25 feet 8 inches high. Inside of this are placed nine horizontal deflectors, each of which is a construction of slats arranged in six sectors, each deflector entirely filling the tank horizontally. The slats in the deflectors are set at an angle, these angles alternating to and away from the centre in successive deflectors so as to give the sewage passing downward through the series of deflectors a sinuous motion. Sewage is admitted at eight points around the circumference of the tank at an elevation two feet below its top, from a 4-inch pipe surrounding the tank at this elevation,

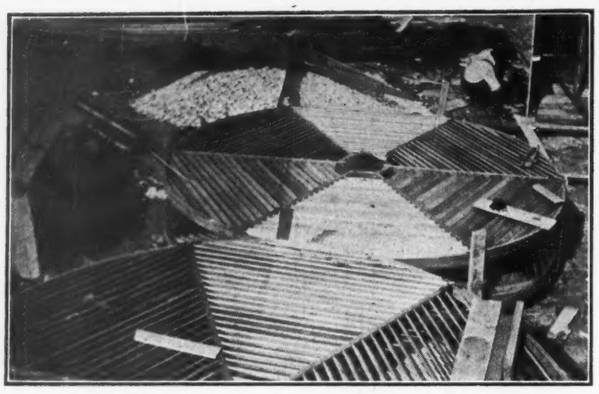


THE THREE IMHOFF TANKS.

Supply flumes at the left. Forebay to entrance weirs at left side of tank, overflow weirs at right side. Top of sludge clean out pipe shown in center of each tank. Built-up section of city in the distance



DETAILS OF SHALLOW IMHOFF TANKS.



DEFLECTORS SHOWING ARRANGEMENT OF SLATS.

which may receive its supply from the quieting tank or from the Imhoff tanks, and is connected with the aerating tank by eight 4x3 T's and 3-inch nipples. The bottom 15 inches of the tank is filled with broken stone, and at mid depth of this is placed a grid of compressed air pipes for admitting air to the tank, while resting on top of the broken stone is an outlet set consisting of a main 5-inch pipe from which branch four 3-inch pipes, each terminating in a 3-inch elbow pointing upward. The compressed air grid consists of two 1½-inch pipes running at right angles diametrically across the tank and connected by quarter circles of ¾-inch pipe, these forming five concentric rings. Each of these rings is perforated with 1-16-inch holes at 6-inch intervals. The compressed air forced out through these last mentioned openings passes upward through the tank while the sewage is passing downward, the nine slat deflectors causing a thorough intermingling of the two. These deflectors are built with a hub after the manner of a wheel and are slipped over a vertical shaft formed of a 4-inch wrought-iron pipe, the deflectors being separated from each other by wrought-iron nipples slipped over the shaft. They can thus be removed readily for cleaning or repairs.

The aerating siphon consists of a 4-inch pipe extending vertically downward 130 feet, the upper 30 feet through a tank 4 feet in diameter and the lower 100 feet through an 8-inch pipe driven into the ground. The 4-foot tank is of wood resting upon piles, and in the bottom of this is a clamp for supporting the 4-inch pipe. At the top of the 4-inch pipe is a 4x6 reducer, on this a 6x6 T, and horizontally from this a 6x5 reducer connecting with a 5-inch line from the quieting tank and the Imhoff tanks. The sewage in passing through the reducers and T, which are larger than both the inlet and outlet pipes, carries down with it air, much of which is absorbed by the sewage at the bottom of the pipe (where it is under 56 pounds pressure) under the law of the absorption of gases by liquids. The sewage with the contained air rises through the annular space between the 4-inch and the 8-inch pipes, into the 4-foot tank, and overflows at the top of this. (To be continued.)

COST OF STREET FLUSHING IN GRAND RAPIDS

The annual report of the Board of Public Works of the city of Grand Rapids, Michigan, states that the street flushing equipment of the city consisted of a Studebaker gasoline automatic flusher and a Sanitary air pressure flusher. With these two machines they flushed 137 miles of street, equal to 3,495,340 square yards, using 2,815,500 gallons of water, 806 gallons per thousand square yards. The cost per thousand square yards was as follows: Water, 4 cents; labor, 31 cents; repairs, 2 cents, and oil, 1 cent; a total of 38 cents per thousand square yards. The equipment cost $2,087.

SEWERAGE HOUSE CONNECTIONS

How Baltimore Requires Property Owners to Construct Them and Finances the Cost for a Five-Year Period.

BY WILLIAM TALBOTT CHILDS.*

The sewage disposal plant of Baltimore, Md., has already been described in Municipal Journal, and descriptions have also been given of certain parts of the sewerage system. In 1906, when work on this improvement was begun, it was estimated that the total cost would be $10,000,000, and a bond issue for this amount was authorized by the legislature and approved by the voters. It was not long, however, before it was discovered that this estimate was much too low, and, after much public opposition, authority was obtained for another $10,000,000 bond issue. It is now found that $3,000,000 more will be needed to complete the system, as at present planned within the city limits, and the Maryland legislature of 1914 will be asked to pass an enabling act for the submission to the voters next fall of an additional $3,000,000 loan. It is believed that there will be no opposition to this in the legislature or by the voters, as it would be neither wise nor economical to stop the work when so much is already done and so comparatively little required to complete the entire system. When the bill becomes a law which will double the city's present area, it will no doubt be found that another $20,000,000 loan will be required to provide sanitary and storm water sewers for the new territory. The complete system for Greater Baltimore will therefore have cost about $50,000,000.

In many sections of the city the system is in operation from house to disposal plant, but a great deal remains to be done in connecting up the buildings to the sewers already constructed. The Sewerage Commission notifies the Health Department when any portion of the new system is in actual operation and in condition to collect, transmit and dispose of house sewage. The Health Department thereupon notifies, in writing, all property owners within that area to connect, at their own expense, and within fifteen days after receipt of the notice, their house drains at the building line and to clean and fill up their privies, sinks, wells, cesspools and other sewerage or drainage receptacles and to abandon the use of their existing arrangements of every sort for the disposal of sewerage or drainage. In case of non-compliance, the city engineer is authorized to do the work required, the cost of which, plus a penalty of five dollars, is added to the tax bills on the property affected, and this cost and penalty with interest at six per cent is collected with taxes on the property, one-fifth each year for five years, and becomes a lien on the property to the same extent as city taxes.

Property owners are also permitted, upon receipt of notice requiring them to connect up their houses with the new sewerage system, to select the plumbers to do the work, and, if the prices quoted by the plumbers are satisfactory to the city engineer, the work may be proceeded with at once, and upon its completion the city advances to the contracting plumber the entire cost of the work and adds such cost to the tax bills on the property connected, which is collected and treated as in the case of property owners defaulting in making their sewerage connections. This system of the city financing the house connections to the new sewerage system has been of great benefit to thousands of property owners who have been unable to pay at one time the entire cost of the work, which cost ranges from fifty to one hundred and fifty dollars, according to the labor and material involved. The privilege given such property owners

*Deputy City Comptroller of Baltimore.

of paying the city the money advanced in five annual instalments has greatly reduced the burden upon some five thousand property owners who have already availed themselves of the privilege, the amount already advanced on these sewer connections by the city being, in round numbers, $275,000.

The form of contract signed is very simple, as will be observed from the reproduction herewith:

CONTRACT FORM.

Notice No. ————————

THIS AGREEMENT, made this.....day of..... 1914 between..... the owner of the property No. ....., party of the first part, and....., party of the second part, and the Mayor and City Council of Baltimore, party of the third part.

WITNESSETH, That the party of the second part agrees to do all the work required by the Act of the General Assembly of Maryland of 1904, Chapter 349, and Ordinance No. 58 of the Mayor and City Council of Baltimore, approved December 28, 1911, upon the property of the party of the first part, No. ....., under the direction of the City Engineer, and subject to the approval of the said City Engineer and the Health Department of Baltimore, at and for the sum of $....., to be paid said party of the second part by the City Engineer upon the completion and acceptance of said work. And the said party of the first part does further agree with the Mayor and City Council of Baltimore that, upon said work being done in pursuance of this contract, and the expense thereof being paid by the City Engineer, on behalf of the Mayor and City Council of Baltimore, the said party of the first part will repay the amount of such expense, plus five dollars ($5.00), in five equal annual instalments, with interest on each instalment from the time such work is done until paid, and that such instalments, respectively, and interest thereon, shall be a lien on the property above mentioned and shall be added to the tax bills thereon for such years and collected in the same manner as the other taxes on said property.

WITNESS the hands and seals of the parties of the first and second parts, and the acceptance, on behalf of the party of the third part, by the City Engineer, hereon endorsed.

Test:

.....[Seal]..

.....[Seal]..

Above contract approved and party of second part therein authorized to proceed with the work in accordance with said contract, this .....day of ..... 191..

.....

City Engineer.

Already sewers and drains have been laid in portions of over 1,000 streets and alleys of the city of Baltimore, the total length being over 300 miles. Sufficient units have been completed at the disposal plant to care for the sewage of approximately 275,000 people, and contracts are under way for additional units to increase the capacity to 600,000 people's sewage, involving a cost of nearly $1,000,000. Today the new system can accommodate connections of 40,000 houses, about one-third of the city thus being able to take advantage of the service.

In the fall of 1912 there was submitted to the voters a proposition to make the new system self-sustaining by charging each property owner a sewer rental based upon the number of front feet, the number of stories and fixtures in the house, and computed so as to provide sufficient revenue to meet the heavy sinking fund, interest and maintenance charges on the new system; but the voters of the city overwhelmingly defeated the sewer rental bill, and therefore the entire cost of sinking fund, interest and maintenance charges will have to be carried in the tax levy, which will amount to nearly $1,000,000 per annum, namely:

Interest on $10,000,000 1980 loan at 3½%.....	$350,000
Sinking fund on loan due 1980.....	37,000
Interest on $10,000,000 1961 loan at 4%.....	400,000
Sinking fund on loan due 1961.....	76,000
	$863,000
Estimated cost of operation and maintenance...	100,000
	$963,000

Equivalent to 26 cents on the annual tax rate at the present assessable basis.

OPERATION OF SEWAGE DISPOSAL PLANTS

Skimming, Sedimentation and Septic Tanks—Keeping Daily Records of Operation—Duplicate Units—Treatment of Sludge and Scum.

By FRANCIS E. DANIELS, A. M.*

PART II.—TANKS.

Our American domestic sewages usually carry about 200 to 800 parts per million of sold matter, of which only about one-third is in suspension. While this amounts to only a minute fraction of one per cent, nevertheless the separation, treatment, and subsequent disposal of the suspended organic matter of domestic sewage still constitutes a considerable problem. The removal of the heavier and coarser suspended solids by grit chambers and screens has been discussed in the first article of this series. It is the purpose here to consider the removal and digestion of the finer materials in suspension, for which numerous forms of tanks have been installed; but before taking up the discussion of the commoner forms of these devices a brief mention may be made of skimming tanks.

Skimming tanks are small chambers so constructed as to allow suspended matters which will float to rise to the surface. These floating materials, consisting of grease, soap, rags, sticks, paper, feces, etc., are skimmed off and removed immediately or composted with lime. They should receive daily attention, and care must be exercised in the handling and disposal of the materials collected.

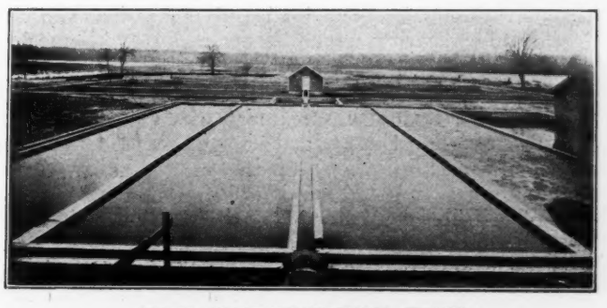
There is one such installation in the state of New Jersey. The tanks are surrounded by a clump of evergreen trees and the skimmings are composted with lime, together with some screenings collected at the same place. In this way quite a considerable amount of material is removed from the sewage and no nuisance concerning the process has ever been reported.

The ordinary sewage tanks are primarily for the purpose of clarifying the sewage, that is, separating as far as practicable the suspended solids from the liquids in order to lessen the danger of nuisances and to provide an effluent suitable for the subsequent processes of treatment. In addition they may be used to hold and digest more or less completely the organic matter which has subsided. We have, therefore, settling or sedimentation tanks, liquefying or septic tangs, Emscher or Imhoff tanks, not to mention those for other purposes, such as disinfection, dosing, storage, etc.

SEDIMENTATION TANKS.

The skillful management of sedimentation tanks requires an accurate knowledge of the results to be obtained, close observation and good judgment. The

*Director of Water and Sewerage Inspection, Bureau of Food, Drugs, Water and Sewerage, Board of Health of the State of New Jersey.



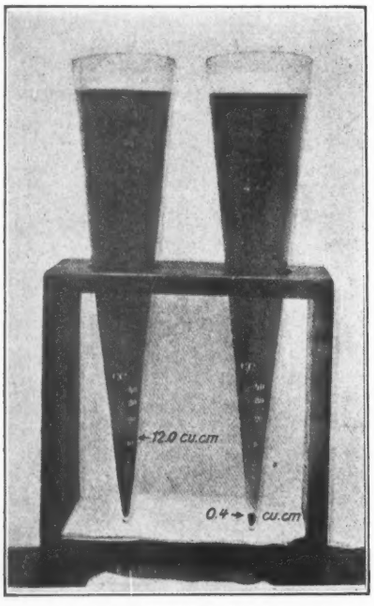
OPEN SEDIMENTATION TANK.
Scum formation beginning in first (right hand) compartment. Tanks may be operated in series or parallel.

first object is to remove suspended matters from the sewage flow; the second is to collect the sludge in the most advantageous manner for subsequent disposal; and the third is to operate without the production of nuisance.

This type of tank is built either as a single compartment or in multiple units. In the opinion of the writer, it should always consist (except, perhaps in very small installations) of multiple compartments with the proper channels and gates so that the chambers may be run either in series or in parallel, and that one or more compartments may be cut out altogether.

In practice there is no sharp line between a sedimentation tank and a so-called septic tank; and whether it is advisable to allow some putrefaction or so-called septic action or to prevent it altogether depends upon local conditions, and what the next step in the treatment of the effluent is going to be. In any case the attendant must study his tanks, and, above all, keep a careful watch upon the effluent.

The writer is aware of some of the adverse criticisms of the German conical settling glasses; but he is also personally acquainted with men who are using them daily and who are strongly in favor of them. In the absence of a better substitute to place in the hands of the usual attendant, a more extended use of such apparatus is advised. These glasses are of a tall conical form and hold one liter each. At the bottom are graduations enabling the observer to read off the number of cubic centimeters of matter which has settled out within a given time per liter. By taking a fair sample of the influent and a corresponding sample of the effluent after the detention time of the tank has elapsed, and allowing each to stand the number of hours it takes the flow to pass through the tank, an approximate idea of the percentage removal of matters capable of settling will be obtained. While this method of testing may be of more practical importance in the operation of Imhoff tanks, yet it is believed it can be used to advantage elsewhere.



CONICAL SETTLING GLASSES.

In this connection let it be emphasized that the plant attendant should keep a "log" and make *daily* entries of everything bearing upon the operation of his works. More complete and extended data which could easily be furnished by wideawake plant managers are greatly needed. In New Jersey two plants have laboratories and are supervised by trained chemists. At perhaps a score of others the plant attendants are taking considerable interest and are making daily tests. At some other places, however, the attendants seem to be incapable of learning how to make tests or of keeping records.

A case in point comes to mind. At one of our plants sewage was emptied from the outfall sewer into a large double concentric tank. In the outer compartment there was considerable septic action which also continued in its inner well. Furthermore, on account of the low connection between the outer and inner compartments, the level of the liquid in the tanks rose and fell ten feet or more with the intermittent action of pumping operations. The pumps lifted the sewage from the inner well and the discharge was foul smelling and full of finely divided particles. These particles quickly clogged the contact beds, which necessitated the washing of the stone. In order to protect the beds a settling tank was built to receive the pump discharge. This was subsequently enlarged to several times the former capacity, and while the effluent from this tank was considerably clearer it did not improve in odors.

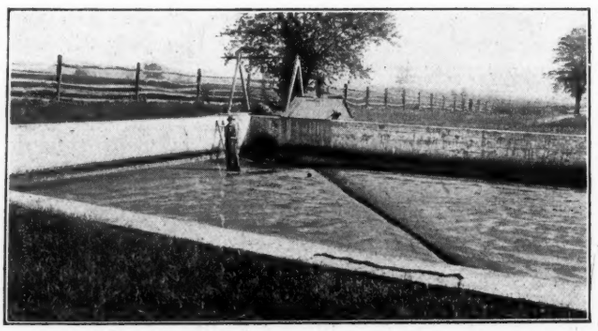
The writer always seriously questioned this method of operation and advised a radical change in the plant, claiming that the pumping should never be in the middle of a sedimentation process but that the pumps should handle either the fresh sewage or the final effluent. He believes that the churning up of a partly digested sediment results in a very considerable lengthening of the time required for the clarification by sedimentation.

Quite recently changes at this plant have been made. The outer compartment has been partitioned off and the sewage, after passing through a bar screen, goes directly into the pump well and is lifted into the sedimentation tanks. The odors at the point of discharge seem to have disappeared and the effluent from the tanks certainly looks much clearer than before. The plant attendant claims that there has been a decided improvement; but records of tests and accurate observations are lacking to confirm his views or upon which to base definite conclusions. This is rather unfortunate because the procedure of operation may have to be quite materially changed to meet the new conditions.

It is difficult to give definite directions in regard to the operation of sedimentation tanks, as individual cases almost always require special methods of procedure. In general, however, let the plant attendant by study and trial arrange the flow either in series or in parallel, whichever will give the better effluent, using only enough compartments to accommodate the quantity of sewage delivered.

In some of our coast towns the summer population greatly exceeds that in winter. This necessitates the cutting in or out of tanks to adjust them to the sewage flow. Too few tanks in use results in only partial sedimentation while the use of too many causes the effluent to be dark in color, foul smelling and full of black and finely divided suspended solids.

To run a sedimentation tank without any septic action whatever will require a very frequent discharge of sludge, and it will often be better in the end to permit septic action for a short time rather than clean out so often. This will, however, depend upon local conditions. At one of the New Jersey plants the sedimentation tank


SHALLOW SETTLING TANK CLEANED WEEKLY.

is cleaned out and scrubbed with a broom every Saturday. This tank never has a chance of causing a nuisance, and while this is no doubt a commendable practice such a procedure would hardly be feasible in most sewage works. In many of our so-called sedimentation tanks cleaning is done only once or twice a year. These, in the writer's opinion, virtually become septic tanks and will be discussed in the next section under that topic.

The sludge removed from sedimentation tanks is slimy, offensive, does not dry easily, is difficult to handle and if allowed to accumulate is very likely to cause serious local nuisance. Whenever possible, the water drained from undigested sedimentation sludge should be returned to the sewage flow and passed through the secondary treatment. This is done in several of the New Jersey plants. The writer believes that most sedimentation, as well as septic tanks, should be built so as to have reserve compartments, so that whenever one tank needs cleaning it can be cut out but not emptied until needed again. This will allow the sludge to decompose and digest. Sludge digested in this way compares more favorably with the much talked of Imhoff sludge and is decidedly more easily handled and without the nuisance attending fresh sludge.

Sedimentation tanks, like septic tanks, may be open or covered. If covered, there should be plenty of openings so as to facilitate cleaning and inspection. Ample provision should also be made for drawing off or otherwise removing sludge and supernatant liquid. The cutting of reinforced concrete to provide for extra manholes and sludge pipes has been a troublesome operation, but it has had to be done in several cases in our state.

Some tanks produce a relatively large percentage of scum. When this occurs it is often better to remove it from the top, especially if it has dried and become hard. There is usually no advantage in breaking up this kind of scum and mixing it with water so that it will run through the sludge pipe, which only results in an increased volume to dry out again on the sludge bed.

On the other hand, at our coast towns sludge and scum alike are broken up with a fire hose and the whole tank contents are flushed out to sea in the early spring. This, however, applies more especially to tanks run on the septic principle.

At each of two installations in the state of New Jersey, the large tank (sedimentation or septic, as you please) was built with a division wall separating it into two compartments, which could be used singly or together. When it became necessary to clean them out it was very provoking to find an opening in the dividing wall left for the purpose of equalizing pressure. It was desired to clean one compartment at a time; but the opening allowed the other side to empty simultaneously. Furthermore, the designing engineer had stated that it was not safe to close the opening to empty one side and keep the other full, as the division wall was not designed for this. With no way to by-pass the incoming sewage this sort of an arrangement is rather trying, and in the face of so many difficulties the useful purpose of such construction is not clear. In one case both sides were drawn down together. In the other, however, the attendant took the chance, closed up the opening and cleaned one side at a time.

All walls should be designed and constructed so as to withstand any pressures likely to be encountered. At one of our plants a man lost his life by the failure of a division wall while cleaning out one side of a tank when the other compartment was full of sewage. In addition to this, the designing engineer should always include in his plans and specifications a fence or other protection around all deep open tanks. Several animals and an eight-year-old boy have been drowned by falling into unprotected sewage tanks in New Jersey.

SEPTIC TANKS.

By the term septic tank the writer means a one-story sewage settling tank, which, in addition to clarifying the liquids, retains the solids and allows them to be digested. The compartments are not cleaned until they become so filled with solids that the increased velocity of the flow causes it to carry over an undue amount of suspended matters and more space is needed.

As there is no sharp line of demarcation between sedimentation tanks and the septic variety, much of what has been said concerning the former applies with equal force to the latter. The plant attendant must study his tanks, his local conditions, and the exact kind of effluent to be obtained.

The compartments must be arranged to give the best practical sedimentation. This can usually be determined by trial. Put in service a sufficient number of chambers to give a good clarification; but too many compartments should not be in use or else the liquids will become unduly saturated with the products of the decomposition of the settled solids, and local nuisance result. They should, therefore, be cut in or out to adjust the capacity of the works to large fluctuations in the sewage flow. Precautions should also be taken to prevent the back-

SEPTIC TANK UNDER A CITY STREET.
Note vents at curbs. No complaints from this tank have ever been received.

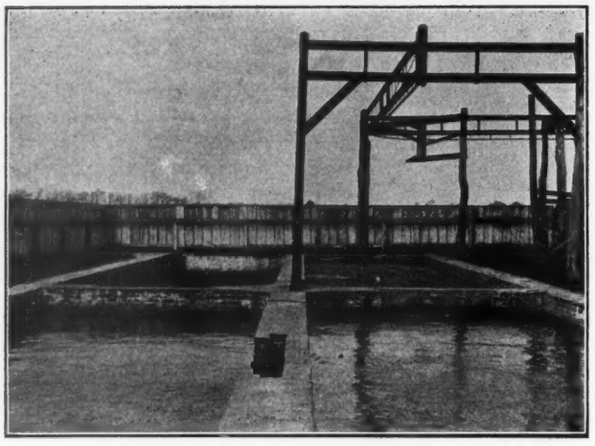
ing up of sea water into septic tanks, as serious nuisance from odors sometimes happens if this is allowed to occur.

As mentioned before, some tanks produce a large amount of sludge and little scum, some a very thick scum with little sludge, while others have about equal quantities of both. In one of our tanks after a run of about two years there was no sludge and only about an inch of sand and grit in the bottom. But a very thick scum formed which had to be removed by shoveling off every few months. At another place the writer found less than a foot of sludge in a tank which had been in use for sixteen years.

If possible, septic tank sludge should be allowed to digest thoroughly before it is disposed of. There are three methods of doing this: One is to cut out a full tank and allow it to stand for six months or more before emptying; another is to draw off the bottom layers of the decomposed materials in small portions at frequent intervals; and a third method is to transfer the solids to other tanks built for the purpose of digesting the settled substances.

In the first method the scum usually softens and disintegrates, especially if the tank be covered; but even in this case it would be well for the attendant to help the process along by breaking up the floating layer if he can conveniently do so.

The second method requires caution unless the tank is constructed with this particular end in view. The sludge will not run rapidly toward the outlet pipe, and channels carrying clear liquids are likely to develop unless care be taken. If, however, a small portion be run out at a time and the material left behind be allowed to level itself somewhat, a considerable amount also be taken to avoid an undue agitation in the tank



OPEN SEPTIC TANKS, SCUM AND SLUDGE REMOVED IN TRAVELLING BUCKET.

which would result in a cloudy effluent, to the detriment of subsequent treatment units. Multiple outlet pipes or a pipe with a movable inlet arm are sometimes of advantage in this connection. It is impracticable to construct an ordinary horizontal flow septic tank with a sufficient slope to the bottom to enable the sludge to flow to one point; but hopper bottoms are useful whenever possible.

In regard to separate sludge-digesting tanks the writer has had no personal experience in New Jersey, although from present indications he may advise a trial of that kind of treatment at one of the plants in this state very soon. There are such tanks at the sewage works in Baltimore; but recent data in regard to their operation are not at hand.

(To be continued.)

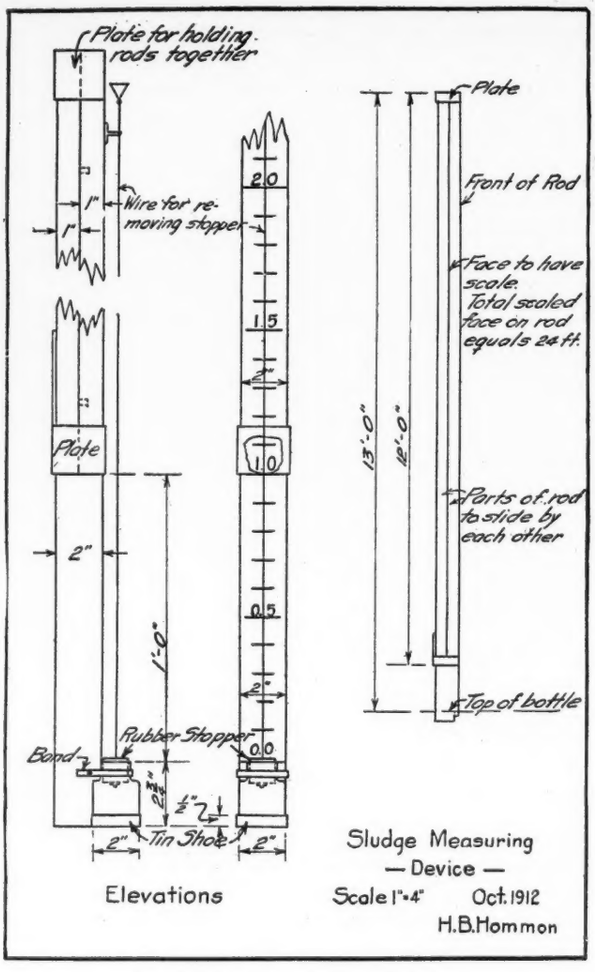
SLUDGE MEASURING DEVICE.

A simple appliance for measuring the supernatant liquid over the sludge deposited in a tank is described as follows in a report by Harry B. Hommon on experiments in sewage treatment conducted by him in Akron, Ohio.

It consists of a graduated rod with a wide mouthed bottle attached to one end and the zero on the scale level with the top of the bottle. A small copper wire is fastened into a rubber stopper and extends through eyes to the top of the rod. A rod 10 feet long is convenient for measuring depths 9 feet or less and for greater depths the extension as shown in the sketch has given good results.

In taking measurements the stopper is inserted in the bottle and the rod lowered into the supernatant liquid by depths of one foot until the sludge layer is located. A new location is then taken and the bottle lowered 0.1 foot or a fraction on each successive trial, depending upon the accuracy desired, until the sludge layer is reached. The sludge deposited in a tank is ordinarily found in a compact mass and the contents of the bottle brought up at each measurement will represent the contents of the tank at any given depth. This was demonstrated very clearly during the tests at Gloversville, N. Y., where a settling tank 8 feet (working capacity) was built with a glass window in the side and measurements taken opposite the window. A series of tests were made with the above device in the hands of a filter attendant and the accuracy of the results warranted its adoption for all future work.

If very accurate results are desired, two men are required, one to hold the rod and pull out the stopper and the other to record the reading of the surface of the water on the scale. When the sludge is in a stage of active fermentation, the contents of the bottle will show black suspended particles, but the true sludge will be apparent as soon as the bottle has been lowered so that the sludge can flow into the bottle.



SLUDGE MEASURING DEVICE.

In computing the volume of sludge in a given tank the depth of the supernatant liquid over the sludge is deducted from the total working depth of the tank.

GARBAGE DISPOSAL IN CLEVELAND.

In 1912 about 44,000 tons of garbage was collected by the city of Cleveland, O., and 23,500 tons during the first six months of 1913, the latter being an increase of about 30 per cent over the amount for the same six months of 1912. The cost of collecting and delivering the garbage at the reduction plant was $2.90 per ton in 1912 and about $2.50 during the first six months of 1913. The cost of treating the garbage after it was delivered to the plant was about $1.95 per ton in 1912 and $1.96 during the first six months of 1913. During 1912 the income from the sale of grease and tankage amounted to $151,000, and during the first six months of 1913 to $76,588. These figures do not include interest on the investment nor depreciation on the equipment. The reduction plant has been operated by the city since January 1, 1905, previous to which time the city paid a contractor $69,400 per year for collecting and disposing of the garbage. At that time collections were made from an area of about 34 square miles, while at the present time there is over 50 square miles within the city limits.

OPERATION OF ATLANTA, GA., SEWAGE TREATMENT PLANTS.

Month 1913	Temperature, Deg. Fahr. Air U. S. Weather Bureau	Crude Sewage	Tank Eff.	Filter Eff.	Vol. Sewage Passing Through Plant M. G. D.	Retention Period in Imhoff Tanks in hrs.	Filter Area in Service, Acres	Analytical Results in Parts Per Million. Suspended Matter Crude	Tank Eff.	Filter Eff.	Organic Nitrogen Crude	Tank Eff.	Filter Eff.	Free Ammonia Crude	Tank	Filter	Nitrogen, Nitrites & Nitrates Crude	Tank	Filter	Oxygen Consumed Crude	Tank	Filter	Dissolved Oxygen Crude	Tank	Filter	Chlorine	Alkalinity	Relative Stability
PROCTOR CREEK PLANT.																												
Jan....	49	61	60	55	3.0	3	1.5	303	88	59	13.6	12.5	3.6	18.3	21.1	12.2	2.2	2.2	6.9	...	...	...	4.3	3.5	8.1	70	180	98
Feb....	45	60	58	54	3.0	3	1.5	213	83	54	14.7	11.5	3.2	19.5	21.5	14.4	2.6	3.0	8.1	...	...	...	4.6	4.2	7.3	73	163	95
Mar....	52	63	60	59	3.0	3	1.5	219	76	68	10.3	7.0	2.7	16.6	17.4	8.3	3.1	2.8	10.0	80	61	25	3.8	3.7	7.1	82	162	98
Apr....	59	66	65	63	3.0	3	1.5	269	60	41	11.1	6.5	2.8	16.8	18.7	6.3	2.6	2.1	9.5	90	59	23	1.9	2.4	6.3	88	192	99
May...	70	70	69	69	3.0	3	1.5	280	60	34	10.7	7.4	2.7	17.8	19.0	7.0	2.3	2.1	8.8	...	...	...	2.1	2.3	5.4	98	183	98
June...	75	74	72	74	3.0	3	1.5	267	64	51	11.3	6.7	3.8	21.1	20.9	8.5	1.6	1.2	7.9	...	...	...	1.6	2.1	4.5	108	192	91
July...	79	77	76	78	3.0	3	1.5	290	58	56	11.5	7.0	3.8	16.5	19.0	8.2	1.4	1.1	5.8	...	...	...	1.0	1.8	4.4	102	183	93
Aug....	78	78	78	78	3.0	3	1.5	...	..	..	...	...	..	...	...	...	..	..	...	...	...	...	1.0	2.3	5.1	104	158	99
Sept...	70	75	75	74	3.0	3	1.5	...	..	..	...	...	..	...	...	...	..	..	...	...	...	...	2.2	3.1	6.1	...	...	99
Oct....	60	74	73	68	3.0	3	1.5	371	55	48	13.9	10.7	5.7	21.5	21.8	11.2	2.7	2.4	11.2	...	...	...	2.7	3.5	5.7	84	...	99
Nov....	54	68	66	61	3.0	3	1.5	296	68	42	15.6	10.7	4.2	20.9	19.9	10.7	2.2	2.3	8.7	95	53	24	3.5	3.8	6.9	76	146	99
Dec....	..	..	..	..	3.0	3	1.5	308	56	40	14.8	9.6	5.3	18.9	21.1	12.7	1.9	2.3	7.0	100	68	32	..	..	..	68	154	..
Yearly Aver...	63	70	68	67	3	3	1.5	282	67	49	12.8	9.0	3.8	18.8	20.0	9.9	2.3	2.2	8.4	91	60	26	2.6	3.0	6.1	87	171	97
PEACHTREE CREEK PLANT.																												
Oct....	60	68	67	61	..	2.5	2.5	97	43	22	9.2	6.5	3.4	10.8	12.2	7.3	0.4	0.3	5.0	...	...	...	0.3	0.4	8.9	75	...	76
Nov....	54	65	62	58	..	2.5	2.5	131	63	37	8.7	6.8	2.4	9.9	11.7	5.2	0.2	0.1	6.5	36	24	11	0.4	1.5	7.5	74	57	97
Dec....	..	60	56	52	..	2.5	2.5	100	59	28	8.4	5.2	2.2	9.3	10.8	5.4	0.4	0.3	6.1	35	26	10	1.4	2.0	8.2	65	62	95
Yearly Aver...	57	64	62	57	..	2.5	2.5	109	55	29	8.8	5.9	2.7	10.0	11.6	5.9	.39	.27	5.9	35.6	25.3	10.6	0.7	1.3	8.2	71	59	89

SEWAGE TREATMENT AT ATLANTA.

In our issue of April 3, 1913, W. A. Hansell, Jr., described the construction of the sewage treatment plants at Atlanta, Ga., and gave the results obtained at the Proctor creek plant during February of that year. Through his courtesy we are able to present a table showing the results for the entire year of the Proctor creek plant, and for the three months that the Peachtree creek plant was in operation.

These plants consist of grit chambers, Imhoff tanks, revolving mechanical screen or roughing filter, and sprinkling filters. It is seen that during the year 1913 the relative stability of the Proctor creek effluent was above 95 (which is generally considered satisfactory) every month, except June and July; and that the Peachtree creek plant was below this only during the first month of operation. The Imhoff tank removed on the average about 76 per cent of the suspended matter, while the sprinkling filters removed about 6½ per cent. The effect of the latter in increasing nitrites and nitrates and dissolved oxygen was very pronounced.

STANDARD TIRES FOR MOTOR TRUCKS.

F. H. SAWYER, Manager Fire Truck Tire Department, The Goodyear Tire & Rubber Company.

The steps taken sometime ago by the Society of Automobile Engineers to standardize wheels for motor trucks and motor-driven fire apparatus, were unquestionably of great benefit to both the manufacturer and user of this class of vehicles. The society did not lay any restrictions on the variety of sizes of wheels and tires that could be used but simply prescribed the dimensions for the wheels.

If one will casually glance at a list of motor truck tires manufactured by any of the leading rubber companies, he will not fail to be impressed with the fact that each size is manufactured in about seven different diameters and the question naturally arises what real sane reason is there for making a tire in so many different diameters? Why could not both the manufacturer and the user confine themselves to solid tires of various sizes made in two diameters only—say 36-in. and 40-in.? At first thought you may be inclined to say that the idea is a fine thing for the rubber companies; it is a good thing for the manufacturer and user of motor vehicles as well. It is an interesting little study in economics.

In considering the changing from other diameters to those of 36-in. and 40-in., we will consider the subject under two broad headings—first from an engineering standpoint, and, secondly, an economic standpoint.

The first condition presents an interesting yet simple problem. If either 36-in. or 40-in. wheels mean an increase in diameter over present equipment, the change will theoretically affect the stability of the car due to raising the center of gravity. It will also increase the ground clearance and the change in diameter of the driving wheels will increase the speed in direct ratio to the diameters and at the same time reduce the tractive effort in exactly the same proportion. Conversely if using 36-in. or 40-in. wheels means a reduction from size formerly used, the center of gravity will be lowered, the stability of the car increased and ground clearance lessened, the speed will be reduced and tractive effort increased. By figuring on the maximum changes, it will be seen that they affect the mechanical operation of the car by only a small per cent, whereas in designing this same car the surplus horsepower and strength is several hundred per cent greater than that theoretically required, therefore the small change in wheel diameters one way or the other is but a very small per cent of the surplus horsepower and strength of the car and will not noticeably affect its operation.

From a business or economic standpoint, the elimination of a lot of superfluous sizes means a distinct advantage to all concerned. To the rubber companies it means a simplification from a manufacturing standpoint, for it is a well known fact that, where any concern confines its product to a few articles and manufactures them in quantities, the unit cost is less than if these articles were turned out in a good many styles and sizes. Again, the large chain of branches maintained by the rubber companies have had to carry millions of dollars worth of motor truck tires in stock and the reduction of superfluous sizes would cut this useless investment in half with a large saving in overhead expense. An elimination of these useless expenses will permit the rubber companies to sell their product for less to both manufacturer, dealer and user of motor vehicles.

To the manufacturer of motor vehicles this simplification insures a lower cost and more prompt filling of his orders, for where the demand is confined to a few sizes the production is more uniform and orders are filled more promptly and satisfactorily.

To the users the benefits are most marked for in addition to the advantages above enumerated, he is assured

a prompt supply from the local branch or agent of the rubber company at any time he may require new tires. Under existing conditions we have known of cases where a truck or piece of fire apparatus was equipped with tires that were not a popular size in that particular locality and very naturally that size was not carried in stock and in case of accident a very natural delay would arise in getting new tires, all of which would have been avoided by eliminating superfluous sizes.

We believe that anyone who will carefully weigh the above facts will be convinced that confining the diameters to 36-in. and 40-in. will be mutually beneficial.

PROGRESS RECORDS OF SEWER WORK.

The engineer in charge of constructing the intercepting sewer and the sewage disposal plant in Schenectady, N. Y., which we referred to in our issue of January 15, is keeping a graphic record of the progress of construction which is useful not only to his office in showing at a glance just how the work is progressing, but also to enable a council committee or any interested citizens to appreciate this with a clearness which figures might not give.

The general method is shown on the accompanying illustration of the interceptor record. The work as plotted on the left hand side of the chart is divided into three parts—the underdrain, the concrete invert, and the sides and top of the sewer. The entire line of the sewer is first laid out by stations, running from zero up to 82 + 50, the space between the lines representing the structure being left open, as shown in the vicinity of station 33 in the illustration. A different color is chosen for each month, the five months of August to December being shown. At the end of each month the section or sections of the sewer completed during that month are filled in with this color. As may be seen, sub-drains are laid in certain sections only and are not continuous throughout the sewer. The diagram also shows that at the end of each month the invert had been carried somewhat ahead of the barrel of the sewer, as would naturally be the case. It appears that at the end of December the sewer had been completed, except that two openings, from about station 31 to 37, and from about station 44 plus 75 to station 55, had been left open because of certain difficulties which could be overcome better later on, as after emptying of the canal, for instance.

At the bottom of the diagram is shown the percentage of work completed at the end of each month, this showing that about 81½ per cent had been completed on December 31.

At the right hand end of the sheet is another set of diagrams, these being vertical columns showing the amount of work done each month on the several items of the contract. Beginning at the left hand end these columns refer to sewer type A; sewer type B; manholes; cast iron pipe; tile underdrain; rock excavation; extra earth excavation; extra earth fill; extra broken stone fill; lumber in foundations; lumber in sheathing; extra concrete, and extra steel. In this case a different scale is used for each column, adapted to the units upon which the bid was based and the total amount of work which is to be recorded. In this case as in the other, different colors are used to represent the work done during the different months.

WATER AND SEWERAGE WORK IN IOWA.

For the Information of Contractors.

Lafayette Higgins, civil and sanitary engineer of the State Board of Health, says fifty Iowa towns will install water works systems or take steps toward securing new water supplies this year. Investigation and assistance from the State Board of Health looking toward the improvement or extension of water systems will be asked by twenty other towns having public water supply.

In an advisory capacity, Mr. Higgins has secured the building of new water supply systems at Storm Lake. Lenox, Mount Ayr, Fontanelle, Chelsea, Centerville and Mitchelville. Installation of these systems is well under way. He is now making investigations of the water sup-

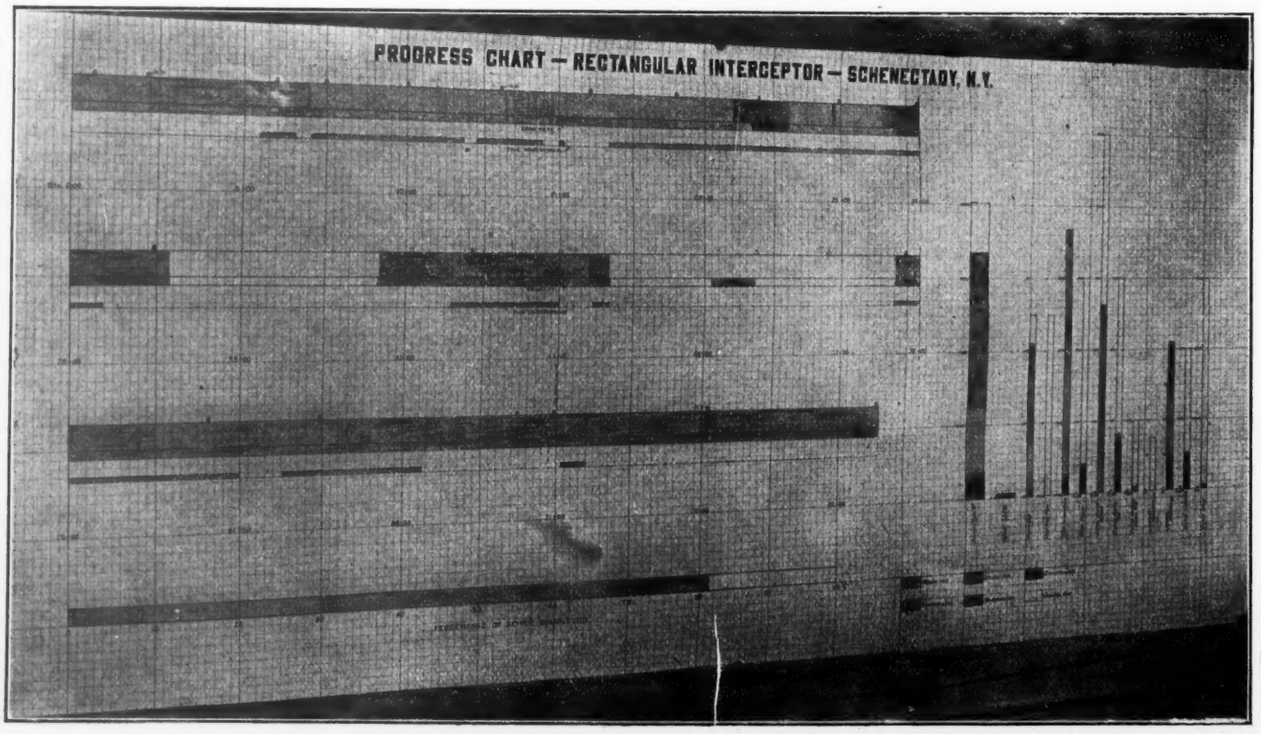


CHART FOR RECORDING PROGRESS OF EACH FEATURE OF CONSTRUCTION WORK.

plies of Guthrie Center, Fort Madison, Mount Pleasant, Cherokee, Valley Junction and Greenfield.

Four cities that have recently put in sewage systems under the direction of the State Board of Health are Valley Junction, Sigourney, Albia and Knoxville. Stratford and Osage are advertising for bids for construction of sewers and sewage disposal plants. Twenty other cities have asked for assistance in planning sewer systems, and it is probable that no fewer than seventy-five Iowa towns will install sewerage systems in 1914, Mr. Higgins says.

Sanitary surveys will be made by the engineer during February and March of the following towns: Bear Creek, Foster, Yoder, Scandia, Mystic, Guthrie Center, Oakland, Seymour, Ellsworth, Mount Pleasant, Cedar Rapids and Des Moines. In the last few months surveys have been made of Rex, Maple, Andersonville, Hawkeye, Ogden, Macksburg, Council Bluffs and Keokuk. Surveys were also made for the proposed sites for hospitals at Clinton, Davenport, Sioux City and the county farm of Polk county.

Engineer Higgins says that all mining towns of the state will be visited by the State Board of Health either by direct sanitary surveys or by rules and regulations specially relating to such towns in 1914 in order that a general clean-up of these towns may be made and the sanitary conditions be made satisfactory. No fewer than one hundred towns will be reached by actual sanitary field investigation by the sanitary engineer, the chemist and the bacteriologist of the State Board of Health during the year.

Mr. Higgins says that the rule of the Iowa State Board of Health recently passed and requiring the submission and approval of plans and specifications for water works and sewage disposal has met with general approval of the engineering profession. The rule provides that the Iowa State Board of Health shall have supervision over water supplies, sewage and garbage disposal plants. It is believed that the constant application of this provision of the rule will successfully safeguard the health of the people. A decrease in the death rate from diseases incident to unsanitary conditions is predicted.

MUNICIPAL REPAIR SHOP ECONOMICAL.

In a letter to Mayor Rose of Los Angeles, City Purchasing Agent Arthur Baker corrects the statement which had been made that repairs can be made more cheaply in outside shops. Mr. Baker's statements are indorsed by J. C. Conwell, chairman of the council supply and efficiency committee.

Mr. Baker's letter in part is as follows: "Until July 1, 1913, the city of Los Angeles did not know the amount of productive and unproductive labor performed by any mechanic in the city's service, and neither the police nor fire departments were able to furnish the correct cost of each repair job for the reason that the productive and unproductive labor cost, overhead cost, etc., were not taken into consideration. In the past the only information obtainable has been information showing the city's transactions by funds.

"It is a fact that for the first time in some time the fire department has all its available apparatus in use and on duty with the exception of that undergoing repairs in the mechanical division, and also that repairs can be made twice as quickly as formerly, which is a very important item.

"We are prepared to prove that the rates charged by the mechanical division of the store department are lower by approximately 15 per cent than rates charged by outside shops for similar work."

CITY STORE BUILDING AND GARAGE, LOS ANGELES.
Where repairs to city autos and fire engines are made.

A table of wages paid the various mechanics follows; including painters, machinists, electricians, blacksmiths, etc., and this statement is analyzed, after adding 20 per cent for administration charges.

The rate per hour charged by the municipal repair shop is found to be from 43 to 72 cents per hour, the greater part of the work costing from 60 to 62 cents an hour, as against the outside charges of from 75 cents to $1 an hour.

The only work which has to be given out is boiler work, which the city plant is unable to handle, and which is done at outside shop for from 75 cents an hour up.

The statement to the Mayor concludes: "The administration charge is aimed to cover the cost of all unproductive labor in the plant, such as the superintendent, clerical force, office expense, tool room keeper, general shop expense including light, power, gas, heat, interest, telephone, building repairs, delivery service, depreciation, etc."

BELMONT FILTER ROOF FAILURE.

Concrete Groined Arch Roof Collapses Ten Years After Construction—Due to Settlement of Fill under Filter.

By GEORGE L. STEELE.

The Belmont filtration plant of the city of Philadelphia, which furnishes about one-tenth of the filtered water used by the city, was completed and placed in service in 1903, and contains 2 subsiding basins, 9 preliminary filters and 18 plain sand filters. Practically the entire plant is of concrete construction. The filters known as Numbers 13, 14 and 15 face Monument avenue. Practically all of the plant, with the exception of these three filters, was on a good foundation of heavy clay. To bring these three to the proper grade, however, it was necessary to fill from 3 to 7 feet along Monument avenue, the pavement of which is about 50 feet below the base of the filters. Under filter 14, which collapsed recently, the fill was greatest and averaged about 5 feet. Before making this fill a cut stone retaining wall was built along the street and the fill made in 1902 and allowed to settle during the winter before construction was begun in the spring of 1903.

At that time a 12-inch layer of clay puddle was placed and thoroughly tamped, and the inverted groined arches which were used for the floor of all the filters were laid directly upon this. The ordinary construction of floor, columns and groined arch roof was followed, the only departure from ordinary practice being that the columns were cast separately and set on the groined base with mortar joints. On completion, the filters were all covered with 2 feet of earth.

During the summer of 1904 a number of cracks appeared on the under surface of the roof, those in Number 14 being worse than the others, extending along the construction joint in the east bay of this filter on the

north, east and west sides. The crack on the Monument street side was parallel to the street and was larger than the others—about a quarter of an inch—and the section between the crack and the street had settled as much as an inch in places. There was a second crack also parallel with the construction joint and west of it, which also was about a quarter of an inch wide. It was not discovered, however, that there was any leakage in the bottom, but an examination of the retaining wall after the collapse showed evidence that the filling back of the wall was quite wet, and it was remembered that at times small quantities of water had seeped through the wall onto the street. As this leakage was not known, however, and probably was not considerable, nothing was done to remedy the conditions for nine years. Toward the end of 1913, the cracks having increased considerably, it was decided to repair the roof, and heavy timber supports were placed in filters 14 and 15. The sills carrying the struts rested upon the filter sand, the system of supports being placed under the lines of the two cracks. The earth covering was then removed from the top of the filters from the eastern edge back for a short distance beyond the first line of posts, the earth which was removed being thrown upon the top of the next line of arches. As soon as the roof was uncovered it was seen that it was in serious danger of collapse, the eastern side of the arch having settled until it was several inches out of line in a number of places. Additional supports were placed, and no further increase in the width of the cracks appeared. Preparations were being made toward the permanent repair of the roof when, early on the morning of December 24, a large part of the eastern end of filter Number 14 collapsed.

As the east end was monolithic from the crown joint down the side and along the floor, it would naturally be supposed that any displacement in the top of the filter must have been accompanied by a corresponding displacement in the bottom, accounting for the seeping into the fill. It is probable that this moisture caused the 12-inch clay puddle and the fill under it to become more or less spongy. When the earth which was stripped off of the end of the filter was thrown onto the next set of arches, the removal of this weight from the eastern damaged section to the crown and umbrella of the second really acted as an eccentric lever. This would account for the fact that the umbrellas were found upside down in almost every case, and the posts that remained standing were nearly all inclined toward the east.

The photograph shows the overturned umbrellas and the clean-cut breaks between these and the tops of the columns. The first line of posts went down entirely. Filter Number 13, which is north of Number 14, had not been stripped at the time of this writing, but Number 15 to the south had the earth covering removed from its eastern end and seemed to be in just about the same condition as was Number 14 before the collapse.

No definite plans have been made for repairs, but temporary bracing has been put in. It seems very probable, however, that several bays will have to be torn out, and it is possible the entire filter may be reconstructed. As the sand has not been removed from the filter, the condition of the bottom is not yet known. While it is probable that the removal of the earth from one bay and piling it on to the next was largely influential in the collapse of the filter at this time, there is little doubt that it would have happened sooner or later. It is considered really remarkable that the arches should have held together during the ten years since the cracks first formed. The concrete itself seems to be excellent, the fractures occuring along construction joints and at the mortar joints between columns and umbrellas.

FILTER NO. 14 ONE WEEK AFTER COLLAPSE. LOOKING SOUTH.

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FEBRUARY 19, 1914.

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"Sewer Gas" Explosions.

A news item from Columbus, Ohio, a few days ago stated that considerable damage had been done to buildings and persons by an explosion of "sewer gas" in a conduit belonging to the telephone company. The older readers of Municipal Journal need not be reminded that this use of the term sewer gas is incorrect, but as the erroneous idea seems to exist in some quarters it may be worth while to again call attention to the fact that there is no such thing as sewer gas. There are occasional explosions in sewers of illuminating gas which has found its way into the sewer through the ground from adjacent leaking gas mains, and there have recently been explosions of the fumes from gasoline discharged into sewers from garages and dry cleaning establishments—which is against the law in most cities and should be in all. These gasoline fumes, however, should not properly be called sewer gas, although the use of the term when they are found in the sewer itself may not be entirely unjustifiable; but to call illuminating gas (which was very probably the cause of the explosion in Cleveland) which is found in a conduit a sewer gas is without any excuse, in our opinion, and is likely by its name to divert attention from the real source of the danger.

Illustration and confirmation may be found in a report by Harry B. Hommon, an expert chemist and bacteriologist, to the director of public service of Akron, O. Following two serious explosions in the sewers of that city, samples of air were collected from the bottom of the sewer in question and analyzed by standard methods.

"The results show that the air in the sewer differs but little from normal air, and that there were no constituents to which the explosion could be attributed. It is probable that the explosions were caused by the ignition of gasoline or of other volatile hydrocarbons originating from garages or dry cleaning establishments. The possibility of explosions from gasoline discharged into the sewers is considerable, and some of the larger cities, notably, New York, Chicago, Pittsburgh and Philadelphia, have rigid ordinances which provide that sewer connections from garages and dry cleaning establishments, or, in general, from all establishments that use gasoline or other volatile hydrocarbon oils, shall be trapped between the building and the sewer. It would be desirable as a means of preventing possible explosions, due to gasoline and other volatile oils, that there be prepared and passed a similar ordinance for the City of Akron."

Sewage Disposal Testing Stations.

The non-technical man is naturally apt to consider that the best way to select a sewage or water purification plant is to adopt a system which he believes to have proved satisfactory in other cities, or to ask for bids and accept the lowest. It often works, just as the cheapest patent medicine your druggist offers you, or that which cured your friend, may cure you—or it may not. Most of us prefer a doctor if the case is at all serious, and the most important part of his service is the diagnosis. Physicians make more errors in this than in prescribing remedies.

A sewage testing station in the hands of an expert is the best known method of diagnosing for designing a disposal plant. It is not always necessary, and would be much less often if existing operating plants would keep exact daily records of their operation, which very few do. We describe this week a large experimental plant which seems justified by the magnitude of New York's disposal problem. Later we shall describe a smaller one which cost the city of Akron, O., about $9,000 to build and operate for nearly a year, which was called for by special conditions as to manufacturing wastes and stream receiving the effluent. The description of experimental plants we consider of more general value than the results of the tests; for the latter are of direct service chiefly to the city whose sewage was used in the tests, while the testing plant itself, like laboratory equipment, could well be copied by others in its most satisfactory features.

Value of Municipal Journal's Statistics.

Readers of Municipal Journal are familiar with the statistics of paving, sewerage and other municipal work which we publish each year in special issues, and many of them have cooperated with us in preparing them by furnishing the figures for their respective cities. A few apparently think the value of the tables is not sufficient to justify the trouble involved in sending the information, although we endeavor to reduce that trouble to a minimum. Many others, however, inform us that they find the tables of great value; as, for instance, we have just received a letter from an official of the U. S. Department of Agriculture asking for the special paving statistics, who writes: "The Department of Agriculture receives your publications and at intervals they are bound into large volumes. Much difficulty has been experienced in obtaining these volumes for any length of

time because of their use as reference books. We are also prohibited to purchase duplicate copies by the Library Bureau. Therefore, if possible, could you let me have the issues of March 15, 1911, March 21, 1912, and March 6, 1913, in order to complete our files on this subject? If this is not possible, could you lend me these copies?"

A further indication of the value attached to the tables is given by the fact that we had not a single copy which we could send at this request, although we publish each year a much larger number of these special issues than of the ordinary ones, of which we endeavor to place in our stock room a sufficient number for future demands; but the demands for these special numbers are increasing every year.

The editorial department of this paper spends a great deal of time and money in preparing these tables, but it is glad to do so because it believes they are worth it. It would relieve the city officials whom it asks to cooperate with it of all trouble on their part if it could, but this appears to be impossible. Their regular annual reports will not generally serve the purpose, for one of the values of the tables lies in the freshness of the information (the tables are published within three weeks of the receipt of the first set of data); consequently it sends them blanks to be filled in, endeavoring to so arrange these as to eliminate useless questions and reduce to a minimum the work of filling them in and returning them.

To such as have assisted us in the past we give our thanks and those of the numerous users of the tables. And we urge both these and others to respond to our future requests for data in order that we may make the tables still more complete. The general assumption is that cities which do not report have done little work (or little of which they are proud), and that little is therefore lost to the tables by the absence of their statistics. But this is not always the case, and each omission detracts from the value which the table would have if absolutely complete. It also leads in many cases to questions by mayors or the local daily papers as to why their city was slighted by the omission; to which we can only reply by referring them to their own officials.

WORK OF A HEALTH DEPARTMENT.

The Health Department of the District of Columbia is one of the few in the country which not only carries on systematically the various activities devolving upon the department, but publishes weekly reports upon the same. As an illustration of the work of the department, the report for the week ending January 3 may be taken as typical. In this we find the mortality records; a statement of all contagious diseases, both a record of those reported for the first time during the week, the total number under observation and the number discharged by death or otherwise. During the week in question, 137 nuisances were reported and 168 were reported abated. Inspections were made of 24 barber shops, 14 lodging and tenement houses, 20 privies, 1 stable, 5 theatres and 47 house to house inspections. Observations were made of 81 smokestacks, 13 violations of the law were reported, and 14 plants were inspected.

During the week the following inspections were made of places where foods are prepared for sale or sold: Bakeries, 4; commission houses, 402; confectioneries, 10; dairies, 21; groceries, 213; hotels, 2; hucksters, 12; lunch rooms, 113; markets, 50; saloons, 6; and cold storage boxes, 8. Ten pounds of veal were condemned and denatured, 11 pounds of mutton, 5 pounds of pork, 30 pounds of giblets, 7 chickens and 7 smoked fish. One grocery store proprietor was prosecuted for failure to keep his premises clean and fined $5; two lunch room proprietors for failure to keep the premises clean and to have them equipped with a proper water supply, each being fined $5; and the proprietors of five lunch rooms were fined $10 in each case for selling adulterated butter.

The chemical laboratory examined 115 samples of milk, 18 of cream and one of water, while the bacteriological laboratory examined 21 specimens of milk and 6 of cream for general bacteriologic content, and 2 specimens of milk and one of butter for the presence of tubercle bacilli.

Eight live stock and dairy farms were inspected in the District of Columbia, 18 in Maryland and 12 in Virginia, 663 cattle being inspected. Five slaughter houses were visited and inspected, and five investigations of rabies were conducted; 6 dogs exposed to this disease were discovered and quarantined for a period of one year.

The food inspection service of the department constantly endeavors to see that only clean and wholesome foods are furnished in the district, and to that end not only are inspectors sent long distances to examine and to supervise the management of the dairy farms from which milk is sent into the district, but the inspectors also visit as often as is practicable each place in the district where foods are either prepared for sale or sold and, when necessary, purchase samples of foods for analysis or examination in the laboratories. Not only is this done to secure clean and wholesome food, but also to insure that it conforms to the pure food laws and is not adulterated with cheaper substitutes and sold under false pretences. An investigation has just been completed by the department of the butter sold in the various restaurants, hotels and lunch rooms, and of 36 samples purchased as butter 17 were found to be oleomargarine. These cases were prosecuted and fines, totaling $140, were assessed.

SEWAGE DISPOSAL PATENTS.

The following letter has been received from the manager of the company which owns the American septic tank patents, giving his view of the present status of those patents. This was submitted to Mr. Potts, whose letter in reply is published also, as representing the other views held on this subject. With these full statements we will consider the discussion as closed—at least until there may be new developments, legal or otherwise.

The Editor, Municipal Journal,
50 Union Square, New York, N. Y.

Dear Sir:

In your publication of December 18th a letter from Mr. Clyde Potts appeared, dated November 28th, under the heading "Sewage Disposal Patents." In referring to the Cameron patent Mr. Potts makes the following statements:

1st.—That the patent expired with the original English patent.

2d.—That the original English patent was for an apparatus, but that when the American patent was taken out it was broadened to cover the process.

3d.—That to come within the process contemplated by the (Cameron) patent the effluent must necessarily be "devoid of free oxygen."

4th.—In addition to the tank effluent being devoid of oxygen, the employment of the process necessarily involved "the liquefaction of the whole mass of solid organic matter contained in the sewage."

5th.—That in 1882 Mouras made experiments identical with Cameron and made the same claims as did Cameron.

6th.—That decomposition of the solids in the Imhoff tank takes place in the lower story of the tank and wholly apart from the current of flowing sewage, and that this is the direct opposite of the Cameron patent where decomposition of the solid matters takes place "within the flowing current of sewage."

7th.—That neither the Imhoff or Travis tank would "involve the Cameron patent."

If all of these statements were true, Mr. Potts' further

statement that the Cameron patent "would appear of no interest to anyone except such as operated tanks in accordance with the process of the patent, prior to the time of its expiration," would be sound reasoning, but while it is true that a large number of engineers hope, and a few perhaps believe, that the situation is as stated by Mr. Potts, we contend otherwise and for the following reasons:

1st.—The process claims of the United States patent not being covered by the original English patent, which, as stated by Mr. Potts, was for apparatus only, were in no way affected by the decision of the Supreme Court in the Knoxville case; moreover, that decision affected Knoxville only, our attorneys having agreed to a stipulation, merely to expedite appeal, that the allegation of identity might be taken as true, but only in that particular case. The distinction above made is conclusive in view of the decision rendered by the Supreme Court of the United States in Leeds & Catlin Co. vs. Victor Talking Machine Co., 213 U. S. 301, in which the question of the expiration of a U. S. patent by reason of the prior expiration of a foreign patent was considered; the portion of the decision pertinent to the present case is stated in the syllabus as follows:

> A patent may embrace more than one invention, Steinmetz v. Allen, 102 U. S. 543, and it may embrace a process and the apparatus by which it is performed.
>
> Where dependent and related inventions are patented separately a foreign patent for either does not affect the other under section 4887, Rev. Stat., and the same rule applies if such inventions are embraced in one patent.

In Cameron Septic Tank Co. vs. Saratoga Springs, the Circuit Court of Appeals made a clear distinction between the apparatus and the process claims of the United States patent, holding the apparatus claims invalid but sustaining the validity of the process claims, thus emphasizing the fact that the expiration of the foreign letters patent, which cover apparatus only, can have no limiting effect on the process claims of the United States patent.

2d.—For remarks on the non-identity of the original English and our United States patent, see reply to No. 1.

3d.—There is nothing in the process claims of the U. S. patent to indicate that the "effluent of the tank must necessarily be devoid of free oxygen."

It is true that in the decision of the U. S. Court of Appeals in the Saratoga case, Judge Lacombe refers to the absence of oxygen in the effluent, and it is a fact that all of the tests for free oxygen in the effluent from the Saratoga tanks showed zero.

The Court of Appeals, however, had before it an instance in which the infringement had utilized the patented process at its maximum efficiency; the crude sewage entering the Saratoga tanks contained only 3 per cent free oxygen, whereas 40 per cent and even 50 per cent is frequently found at the inlet of septic tanks so located that the sewage entering them is much fresher than at Saratoga. In such cases there is a substantial reduction of free oxygen at the outlet, but not necessarily a total absence as at Saratoga, nor do the process claims of the patent require it.

4th.—It is true that the first of the five process claims of the Cameron patent requires the liquefaction of substantially the "whole mass" of solid organic matter contained in the sewage, but the other four are not thus limited. Therefore, as to at least four of the five process claims of the patent, a substantial reduction in the volume of solids is all that is necessary; if these four claims contemplated liquefaction of the "whole mass" of solid organic matter, they would have so stated, as in the first claim.

5th.—To prove that Mouras' experiments were in no sense identical with the Cameron process claims, we quote from the decision of the U. S. Court of Appeals in the Saratoga case. In that suit the defense devoted considerable time in an effort to prove that the septic process was anticipated by Mouras. Summing up the mass of Mouras' literature in the record, consisting of the observations of text-book writers and newspaper men upon Mouras' apparatus and process, the court refers to them as:

> * * * mere vague and general representations * * * not sufficient to enable those skilled in the art or science to understand the nature and operation of the invention and to carry it into practical use. We find in them nothing to indicate that by changing Mouras' inlet so as to avoid agitation by eliminating his large influx of fresh water with the eddies and the oxygen which it brought one could establish a separate workshop for the anaerobes, and by that change modify the Mouras' process with beneficial results. None of them present "an account of a complete and operative invention capable of being put into practical operation," by establishing purely anaerobic conditions in a septic tank and maintaining them till an equilibrium was established which would permit an indefinite retention of the solids. Nor is this conclusion the mere inference of one unskilled in the art: This Mouras literature was published in the early eighties but no septic tank such as Cameron describes was built until his first experimental structure was set up at Exeter in 1895.

6th.—That decomposition of the solid matter does not necessarily take place within the flowing current of sewage, I quote the following from Judge LaCombe's decision in the Saratoga case:

> It is not necessary to cite the evidence which complainant's cousel has collated to show that the action which takes place in the septic tank—"the workshop of the anaerobes," is correctly set forth in the patent. One of the defendant's experts, not incidentally but in a carefully phrased answer to a specific question, says: "I believe further that the action (anaerobic) which, as I have stated nearly always in my opinion has already begun before the solids have reached the tank, is continued in every portion of the tank both in the surface scum and the bottom deposit and in the liquid contents." Our attention has been called to nothing in the record which controverts or qualifies this admission in any way, and it must be accepted as true.

7th.—The chamber of the Imhoff tank that is termed the 'decomposing room" is a septic tank embodying the essence of the process for which Cameron gave to the sewage disposal art the new term of "septic," the process consisting in the secluded pool of bacterial solvent-medium guarded from agitation and aeration, fed by intaken organic matters, and scavenged of its waste products by quiescent outflow. The so-called "sedimentation chamber" of Imhoff, crossing the upper part of his "decomposing room," is simply the channel from which that heavier part of the sewage especially requiring septic treatment quiescently flows down into the "decomposing room" of the septic tank, such inflow of heavier matter constantly displacing a like proportion of the liquid contents that quiescently flows up from the "decomposing room" into the same channel (thence flowing on to the aeration and possible filtration stages)—thus maintaining the quiescent intake of organic matter and outflow of liquid, with the pool of bacterial solvent constantly preserved. The occasional withdrawal of fully reduced sludge from the bottom of the "decomposing room" is likewise a quiescent outflow and is simply a modified form of the withdrawal of sludge-residuum that is commonly practiced in the septic process and in fact provided for in the Cameron patent. We are aware that some of the engineers who are exploiting the Imhoff tank claim that it does not infringe the Cameron patent, but while we may have a high regard for them as engineers, we consider, and we have ample confirmation, that their opinions of the legal question regarding the validity and infringement of our patent are in serious error. They, with others, were prompt to recognize the utility of the septic process when it was first introduced into this country, and freely advised their clients that it was "unpatentable." But the United States Court of Appeals took an opposite view of that legal issue and sustained the patent. Later we find them undertaking to advance another legal opinion with respect to whether or not the Imhoff system is an "infringement" of the septic process. We are content that they are now as seriously mistaken in their views on the legal issue of "infringement" as they were on the legal issue of "patentability." The foregoing remarks apply equally to the Travis or Hampton tank.

Briefly stated, any tank in which organized and systematic development of putrefaction is relied upon for the disintegration and liquefaction of solids is an infringement of the process claims of the Cameron patent.

Mr. Potts' letter on "Sewage Disposal Patents" comes at an opportune time, and especially so as, instead of indulging in glittering generalities, he has evidently attempted to crystallize the views of many leading engineers on this much abused subject. We feel especially grateful for its publication, as it has given us an opportunity to make reply, so far as the Cameron patent is concerned, in equally concrete form.

Yours very truly,

H. D. WYLLIE,
Manager Cameron Septic Tank Company.

The Editor, Municipal Journal, New York City.

Sir: Mr. Wyllie's letter of December 23d, 1913, in reply to mine regarding septic tank patents, which appeared in your issue of December 18, is before me. I would be glad to write fully in regard to this matter, but to do so would require pages of your paper, much more than you would care to give. After I had done so Mr. Wyllie could write an equal number from his viewpoint and the sum total would be nothing. The airing of a few interesting points in regard to these patents may, however, be entertaining if not conclusive.

In my previous letter I endeavored to be as brief as possible and consequently did not fully fortify the statements I advanced from the data which I had at hand.

To facilitate the discussion I will take up my previous statements in the same order and under the same classification as given by Mr. Wyllie, namely: "1st—That the patent expired with the original English patent."

I base this statement on the stipulation that the Cameron Company made in the Knoxville case. They were permitted to go to the Supreme Court in that case only after they had agreed that the American patent was identical with the English. Until there is a court decision otherwise it is fair to assume identity.

"2d.—That the original English patent was for an apparatus, but that when the American patent was taken out it was broadened to cover the process."

A perusal of the English patent (No. 21,142) and the original American application, discloses that this broadening occurred during the prosecution of the patent. No mention is made in the English patent of anaerobic bacteria nor in the original American application.

"3d.—That to come within the process contemplated by the (Cameron) patent the effluent must necessarily be 'devoid of free oxygen.'"

I base this statement on the testimony of Mr. Wyllie given in the case of the Cameron Septic Tank Company vs. the City of Saratoga Springs, Vol. 1, page 406, as follows:

It is the proportioning and operation of the Cameron septic tank in accordance with the description of the Cameron patent, which provides a resting place and cultivation of the anaerobic bacteria sufficient and sufficiently extended so that sewage, even if containing substantial quantities of free oxygen upon entering the tank, will lose its free oxygen and then be subjected for the rest of its course to the undivided action of the anaerobes,

and further on in the same book:

Fourth, house wastes are loaded with free oxygen of the air and the proportions of the macerating tank were not such as to give this oxygen a chance to be exhausted while they were flowing through the tank. The treatment in the tank was, therefore, of necessity, substantially the aerobic treatment which ordinary sewage receives in the sewer before it reaches the septic tank. The constantly arriving house wastes carried so much oxygen into the little macerating tank that the body thereof between what sediment and scum existed, was necessarily full of free oxygen which would not only prevent the action of anaerobes in the body of the sewage, but would prevent their cultivation or life on the surfaces of the scum and sediment presented to such body, and limit the cultivation to the interior of the scum or sediment about as I have explained that the cultivation of anaerobes is limited to the interior of a carcass when exposed to the atmosphere.

Judge Lacombe, in his decision, subscribed to this in the following language:

"The essential features of Cameron's process are these: He secures separate and successive action of anaerobes and aerobes on the organic matter of the solids in the flowing current of sewage. He first sets the anaerobes to work under such conditions that whatever aerobes were present in the flowing current as it enters the anaerobes' workshop are quickly destroyed, because without air or oxygen they cannot live, and at the outflow end of his septic tank there is absolutely none; tests mark free oxygen as zero. He cultivates this colony of anaerobes under conditions most favorable for their growth and activity, eliminating light, air, and agitation while the slowly moving current is exposed to their activities. There is some oxygen present when the sewage flows in, although it has all disappeared before it flows out; and the current is not completely at rest, it flows in a quiet manner—were it stagnant, the desired bacterial action would be disturbed and retarded."

This was Judge Lacombe's idea of septic action and his whole opinion was based on this understanding of it. If his understanding was wrong it necessarily follows that his opinion and consequent decision was wrong.

"4th.—In addition to the tank effluent being devoid of oxygen, the employment of the process necessarily involved 'the liquefaction of the whole mass of solid organic matter contained in the sewage.'"

This statement is supported by a careful reading of all the process claims of the patent. They are too lengthy to be quoted here, but are of interest (See U. S. Letters Patent No. 634,423). The statement is further supported by the testimony of Mr. Wyllie in the above named case against Saratoga Springs, as follows (page 370):

"The septic scum is a product of the maturing stage, but when it is formed it becomes a permanent fixture or part of the apparatus and an essential element by the presence of which the tank becomes a septic tank. Every scum, however, is not a septic scum and every scum does not make a septic tank. To be a septic scum it must be a matured and ripened scum in which the anaerobes have been cultivated and established to effect the equilibrium referred to by Mr. Snow, or, as expressed in the claim—'sufficient to liquify the solid matter of the flowing sewage,' and prevent the substantial increase of solids; or, as stated in the specification, 'avoiding the formation of sludge.'"

This is apparently the distinction between septic tanks and ordinary sewage settling tanks. The septic tanks must have scum indicative of septic equilibrium. Presumably the anaerobes must be present in sufficient numbers to liquefy the solids, thus establishing a condition of equilibrium between the bacteria and the solids. Their presence is indicated not by the nature of the scum but by the establishment of the condition of equilibrium.

"5th.—That in 1882 Mouras made experiments identical with Cameron and made the same claims as did Cameron."

The article referred to in the Engineering News shows the identity of the experiments of Mouras and Cameron, even to glass models being constructed by the Frenchman to observe the manifestations in the interior of the liquid contents of the tank, as was later done by Cameron. Mouras tanks were designed to strip the sewage of its solids so as to permit the effluent to enter the sewers of Paris, which at that time were used only for storm water. It was unlawful to discharge fecal matters into these sewers. The Mouras tanks were designed to restrain the solids and thus dispense with cesspools, which were common in Paris. In building these tanks Mouras discovered what he thought to be an action dissolving the solids. This action was attributed by a supporter of Mouras to the anaerobic bacteria of Pasteur. Shortly after Mouras' discovery, sewage matters were permitted to enter the sewers of Paris, and consequently Mouras tanks did not come into general use. The use of sewage tanks at Asbury Park, Belmar, Ocean Grove and similar places is parallel to their use by Mouras.

"6th.—That decomposition of the solids in the Imhoff tank takes place in the lower story of the tank and wholly apart from the current of flowing sewage, and that this is the direct opposite of the Cameron patent where decomposition of the solid matters takes place 'within the flowing current of sewage.'"

This statement is in accord with the above quotation from Judge Locombe and further apears to be supported by the patent which clearly states:

The invention consists in certain methods of developing in a flowing current of sewage bacteria capable of dissolving the mass of solid organic matter contained therein, of subsequently utilizing the so-developed bacteria in liquefying the mass of organic matter contained in the flowing current, and of further purifying the effluent liquid.

The theory has always been advanced by the Cameron Company and adherents of the septic theory that a condition of equilibrium is established between the anaerobic bacteria and the solid matters in the flowing current of sewage. The result of this equilibrium is an elimination of the solids through the agency of the anaerobes. (See Wyllie's testimony regarding this point, in Saratoga Case Vol. I, page 269, as follows:)

When the maturing stage is complete, we have reached the point which the specifications expresses as "avoiding the formation of sludge," and the claims expressed by saying that the "mass of micro-organisms has been developed of a character and quantity sufficient to liquefy the solid matter of the flowing sewage, the inflow serving to sustain the micro-organisms."

7th.—That neither the Imhoff nor Travis tank would "involve the Cameron Patent."

This, of course, was predicated on the assumption that my previous remarks or a substantial portion of them were true.

Obviously, if the Cameron patent expired with the English patent, Imhoff and Travis are not involved in any way with a defunct patent. Equally, if my other statements were true, they are not involved. Neither Imhoff nor Travis avoid the formation of sludge, nor are their effluents devoid of free oxygen.

I am sorry this letter has gone to such lengths, but the subject of septic tank patents is an interesting one because the sewage disposal problem is largely a sludge problem and in its earlier stages it was claimed and hoped that the so-called septic tanks solved the problem by avoiding its formation. Continued use failed to verify these claims and disclosed no essential differences from neglected settling tanks of prior use. A discussion of the subject, however, is healthful as it discloses the fact that not only did Cameron fail to solve the sludge problem, but that it still remains unsolved. The Imhoff tank is a logical development in the art of sludge treatment and in the plants in use avoids at least the formation of a disagreeable sludge.

It is unfortunate that the septic tank controversy was ever permitted to be carried to such lengths, as it has no doubt injured the progress of the art of sewage disposal. Under other and more fortunate circumstances the intelligent services of Mr. Cameron and his associates could have been utilized along constructive lines as has been the case with Dr. Imhoff.

Trusting this letter will throw some light on a much discussed question, I am,

Very truly, CLYDE POTTS.

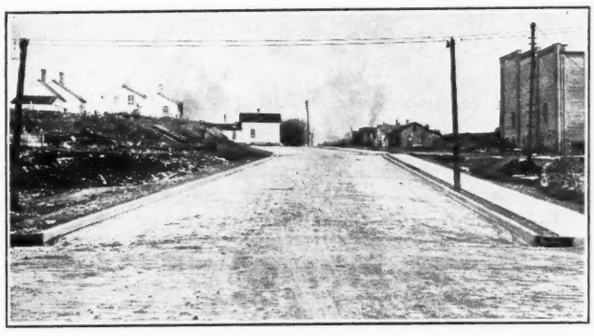
The WEEK'S NEWS

Concrete Bridge in Lisbon, Me.—Want $1,000,000 for Baltimore County Sewers—Reports from Profitable Municipal Water Plants—New York Firemen Will Meet in Schenectady—Commission Government Decreases Indebtedness of Gulfport, Miss.—Low Bids for Philadelphia's Waste—Pittsburgh's New Municipal Market.

ROADS AND PAVEMENTS

Concrete Pavements in Sheboygan, Wis.

Sheboygan, Wis.—The excellent condition of Sheboygan's concrete pavements has brought city officials here to make inspections. In 1911 and 1912 about 60,000 square yards of reinforced concrete pavements were laid. These were designed by City Engineer C. U. Boley. The base consisted of five inches of concrete mixed in the proportion of one



Courtesy The Sheboygan Press.
VIRGINIA AVENUE PAVED WITH CONCRETE.

part Portland cement, three parts sand and five parts crushed limestone. It was five inches thick at the center and three inches at the curb. The wearing surface was 1¾ inches thick and consisted of 40 per cent. Portland cement, 50 per cent. granite screenings and 10 per cent. Torpedo sand. The granite screenings were graded to 20 per cent., having a size of 1-16 to ¼ inch and to 30 per cent. ¼ to ¾ inch. Triangle mesh, reinforcement style, number 7 was laid between the wearing surface and the base, the longitudinal wires being placed crosswise of the street. To allow for the expansion and contraction of the pavements under varying conditions of weather, expansion joints were used, which were properly filled with elastic material. Virginia avenue, shown in the accompanying illustration, was especially designed for heavy traffic. The base was therefore constructed thicker, though its components were the same as described above and thoroughly mixed in a concrete mixer. The wearing surface is mixed in the same proportions as stated, 10 per cent. sharp bank sand and 20 per cent. crushed granite of ¼ inch to dust, constituting the differing features of the ingredients.

$12,672 Spent on Highways in One Month.

Flint, Mich.—During January the county road commissioners have invested $12,762.33 in improving the roads of the county, the largest amount that has ever been spent for that purpose in the same month of any preceding year. In January a year ago the amount was $9,706.65; in January, 1912, $3,555.55 and in January, 1911, only $973.76. During December of last year the amount invested was $5,812.94.

Road and Bridge Construction in Sac City, Ia.

Sac City, Ia.—The report of County Engineer W. D. Maxwell is indicative of the progress that can be made by any county that will put its road work on a modern, business basis. The report shows that seven miles of road have been graded on the county road system to establish permanent grades, the expenditure amounting to $8,326.50. On the township road system, one and three-fourths miles have been graded in a similar manner at a cost of $1,025. Gravel surfacing has been placed upon one mile of the county road system. On the list of bridge work the largest item is the two-span, reinforced concrete arch bridge over the Raccoon river at Sac City, erected at a cost of $14,800. Other bridge work done during the season included six bridges of spans from sixteen to twenty-four feet, and the construction of 238 permanent culverts, ranging in size from twelve-inch diameter to ten feet by six feet box culverts.

May Lose $12,000 State Aid By Not Applying.

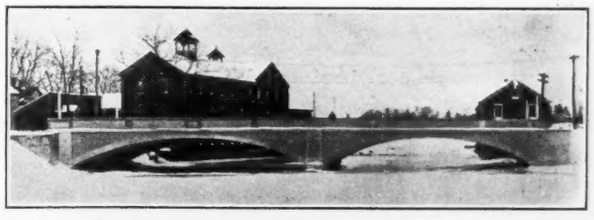
Allentown, Pa.—Unless Lehigh county wants to lose over $6,000 in cash and double that value in improved roads, supervisors in different sections must get busy at once and plan for improved roads and make application to the state highway department for money that is now lying idle in the state's funds, available for state-aid roads in Lehigh county. According to information received from the state highway department, there is now available in the state treasury for Lehigh county $12,468.58 for use on state-aid roads. The amount of road that can be built will really be double in value for the act under which the money was appropriated provides that an equal amount of money must be contributed by the county township or borough which makes application for money for roads. Actually then almost twenty-five thousand dollars worth of road could be built at once at just half the cost to Lehigh county.

Convicts Will Build Tri-State Road.

Denver, Colo.—The construction of a convict-built highway from Colorado to the Gulf of Mexico will be undertaken jointly by the States of Colorado, New Mexico and Texas, according to a statement made by Warden Thomas Tynan of the Colorado State penitentiary. The proposed road would be the longest highway ever built by convict labor and would be one of the longest continuous boulevards in the world, according to Warden Tynan. It would be approximately 1,220 miles, traversing the length of Colorado southward through New Mexico and Texas to Galveston. Tynan has found that convict-built roads in this State can be constructed at a cost of $389 a mile and on this basis the total cost of a Colorado-to-the-Gulf highway would be $474,580.

Concrete Bridge at Lisbon, Me.

Lisbon, Me.—What is without doubt one of the finest concrete bridges in the State has recently been completed and opened to traffic in the town of Lisbon. The handsome and thoroughly modern structure spans the Sabattus



Courtesy Portland (Me.) Evening Express.
CONCRETE BRIDGE SPANNING SABATTUS RIVER.

River at Lisbon village. The new bridge is 147 feet long over all and has a clear roadway of 24 feet and two five-foot sidewalks. It has two 64-foot spans, supported at the center by a concrete pier 5 feet wide. The railings

are of concrete with pilasters spaced 30 feet apart. Extending between the pilasters are recessed panels six inches thick and finished with a concrete coping on the top. The recessed panels in the spandrel walls and railing are bush hammered to resemble stone, and all other parts of the bridge are to be rubbed with carborundum stone until a smooth finished surface is obtained. A lighting system composed of six concrete light posts is in keeping with the rest of the bridge. The work has been in charge of the board of selectmen, A. O. White, George E. Williams, and F. G. Coombs. The Sanders Contracting Company had charge of the construction work, which cost $11,000, including all items.

Regulate Hauling on Gravel Roads.

Peru, Ind.—County Superintendent of Roads O. A. King has issued an order for placards which are to be printed and circulated, giving warning to persons living in the county about heavy hauling on free gravel or macadam roads when the road is thawing or by the reason of wet weather may easily be cut up or injured by heavy hauling. The circulars also give the limit of the loads, including wagon and driver. The placards which will be posted at all public places read in part as follows:

Less than three-inch tire not more than 2,500 pounds.
Three inches or less than four inches, not more than 3,000 pounds.
Tires four inches or less than five inches, not more than 3,500 pounds.
On any vehicle with tires five inches or over, not more than 3,800 pounds.

Violators of this act will be fined from $5 to $50, and road supervisors making arrests will receive $2 for their services.

Will Construct 24 Miles of Gravel Roads.

Opelousas, La.—The committee appointed by the St. Landry Parish Police Jury to determine the roads to be constructed by the parish out of the proceeds of $100,000 in hand for that purpose has met here and decided to construct six miles of good roads in four directions, north, south, east and west from Opelousas, a total of twenty-four miles. Bids were called for by the committee, and it is expected that work will commence in the near future. The roads are to be constructed of gravel.

Traffic Increased by Good Roads.

Los Angeles, Cal.—The influence of good road construction upon the increase in traffic, is strikingly shown in figures compiled by the California Highway Commission relating to the gain in the number of motor trucks in Los Angeles county, since the 300 miles of improved county highway began to be available in that section. Since December 31, 1909, when the good roads agitation began to crystallize into construction in Los Angeles, motor trucks in that county have increased as follows: Number in use December 31, 1910, 64; on December 31, 1911, 985; on December 31, 1912; on December 31, 1913, 3,100 or more.

Prepare for Good Roads.

Highland Mills, N. Y.—Town Superintendent J. Goetchius has been engaged for the past week in painting and overhauling the road machinery so that it will be in condition for working the highways early in the spring. It is intended to give the road in this section a top-dressing, oiling and resurfacing and other improvements will be made where necessary to put the road in the very best condition.

Pass Federal Good Roads Bill.

Washington, D. C.—TheShackleford bill, under which the federal government would distribute $25,000,000 for good roads among the various states, conditioned upon a dollar-for-dollar appropriation by each state, has been passed by the House by a vote of 282 to 42, and awaits action by the Senate. Its passage followed several days of debate, during which most of the hundred and more speakers advocated the project in the interest of the farmers, while a minority attacked the project as a dangerous opening wedge for heavy future inroads on the treasury.

Road Builders to Practice Economy.

Madison, Wis.—Chairman J. A. Hazelwood and Secretary W. O. Hotchkiss of the Wisconsin Highway Commission told the 400 highway builders attending the third annual road school, which has opened in the assembly chamber of the capitol, that the state commission intended to issue an order advising county highway commissioners to use only as much money for highway construction this year as could be economically spent. There is available for road construction in Wisconsin this year the sum of $4,500,000. Chairman Hazelwood and Secretary Hotchkiss said that proportionately better results would probably be secured if not more than $2,500,000 were available for road building. It will not be possible, they asserted, to get sufficient competent men to do $4,500,000 worth of road building in the state this year. Gov. McGovern told the road builders that it was up to them to demonstrate to the taxpayers that they were getting a "dollar's worth of road for every dollar of tax."

Will Pay Less For Farmers' Teams.

Richmond, Ind.—Farmers who have been renting teams under the old road law for road work are interested in the interpretation of the new law, as to what amount may be expended by the assistant road superintendent for teams. A farmer in the northern part of the county, representing several farmers in the community, wrote to the state board of accounts, asking for an interpretation of the law. The reply from G. H. Hendron, state examiner, states that only forty cents an hour may be spent for teams. This is less than the usual price paid. Previously, teamsters received about sixty cents an hour, sometimes more or less, according to what degree their services were required.

SEWERAGE AND SANITATION

Asks $1,000,000 for County Sewers.

Baltimore, Md.—A sequel to the county sewerage controversy which was agitated in Baltimore county for a time last year will be found in a bill which T. S. Offutt, counsel for the County Commissioners, is preparing authorizing a loan of $1,000,000 for a county sewerage system. Plans have been drawn and estimates made for the Commissioners by the engineers of the State Board of Health. It is figured that $1,500,000 will be needed for a complete county sewerage system. The $500,000 which is not provided for by the bill will be obtained by assessment from the county according to the figures of the engineers and Mr. Offutt. Other bills are being prepared by Mr. Offutt, and all will be presented to the Legislature in the near future. They include a road bill and a bill providing for five instead of the present three County Commissioners.

Princeton's Sewage Plant.

Princeton, N. J.—Princeton University's new sewage disposal plant, completed last week, is one of the most modern of its kind in the country. Built under the recommendations of C. W. Hendrick it has cost the university $45,000. Through a 10-inch pipe the sewage is carried to the new plant, where it first passes through a grit chamber. The second process takes place in the Imhoff tank, where the solid matter settles and is later drawn off to a sludge bed after becoming thoroughly decomposed. The fluid is then sprayed onto a crushed rock bed and allowed to filter through, passing off into a second settling bed. From this point the effluent, now thoroughly cleansed, is emptied into Carnegie Lake without producing any disagreeable odors as did the old system of spreading the sewage on the open field to dry.

Remove Roots from Sewer.

Altoona, Pa.—Employes of the highways bureau are now engaged in the work of cleaning the intercepting sewer leading from the city through Llyswen. It has not been cleaned for two years, and there are many places where roots from adjacent trees have grown into the sewer and where they have multipled until it is half closed. As a result the sewer is overloaded and the water gets into the cellars. The work of cleaning the sewer is accomplished by a large funnel-shaped apparatus which fills the pipe and is dragged through, cutting the roots along the course with its sharp and heavy edges.

Sewer System Half Completed.

Urbana, O.—The contractors are approximately half through with the construction of the sewer system which is fourteen miles in length. According to estimates at hand they have furnished 8 miles. The estimate of the entire system is $78,622.86 exclusive of the cost of installing house connections. The cost of the engineering and inspection has amounted to $509.25. The contractors are now working on the deepest part of the entire system. The trench which is being dug at present is 29 feet deep. Excavations are made by a digging machine and the dirt is removed by means of a derrick.

$25,000 To Fight Smallpox.

Niagara Falls, N. Y.—Health Officer Gillick has presented to the Board of Estimate and Apportionment an estimate on the cost to the city of the smallpox epidemic. Dr. Gillick said that he thought about $25,000 would cover the actual expenses of the city in fighting the disease. The pay of men employed as guards and to fumigate houses amounts to $325 per day. The nurses, 20 in number, receive a total of $70 a day. Groceries, meat and fuel supplied families under quarantine cost about $80 a day. Two physicians receive $12 a day each for vaccinating. The compensation of Dr. Edward Clark of Buffalo, here assisting Health Officer Gillick, has not yet been fixed.

WATER SUPPLY

Hearing on Filtration Methods.

Beverly, Mass.—At a hearing to be given by the legislature to interested parties, the question of the most suitable method of filtration of the water that will soon be taken from the Ipswich River, will be thoroughly discussed. About a year ago a commission was appointed to carry out plans for securing an additional water supply for Beverly and Salem; in their deliberations the commissioners found that the state board of health was adverse to mechanical filtration. There seems to be some difference of opinion as to whether sand or mechanical filtration would be superior, so to ascertain what the experiences of other cities, with a population of about 20,000, have been, President W. O. Wylie, of the Board of Aldermen, is making thorough investigations.

Municipal Plant Yields $425,432 Profit.

Omaha, Neb.—Water consumers in the Metropolitan water district have paid $1,121,761.86 for water since municipal ownership became a reality, July 1, 1912. The total income of the water plant in the eighteen months ending December 31, 1913, amounted to $1,312,115.62. A profit of $425,432.08 was made in the same time over and above the cost of operation, maintenance and interest on bonds. The actual operating expenses during the year and a half were $300,000 and the general expenses nearly $80,000. The interest on bonds amounted to $485,000. In addition to making a profit of nearly a half million dollars in the eighteen months the water board has also reduced rates 33 1-3 per cent.

Fourth Year of Municipal Plant Profitable.

Knoxville, Tenn.—The city water plant for the twelve months closing January 23 shows that the receipts were $185,212.82, exceeding the expenditures $70,832.93. In addition, the city used water which had it been purchased from a privately owned plant would have cost $24,623.53, so the profits for the year were nearly $100,000 and almost equal to the cost of operation. This was the fourth year of municipal ownership for the plant.

Increase Water Supply.

Orangeburg, S. C.—The pump in the new station, just completed at a cost of $1,000, has been placed in operation and the water from the wells is being forced through the mains at a rate of 80 to 100 gallons per minute. This will materially increase the city's daily supply. An extension to the pumping station will soon be constructed for use as a power station.

State Plans Quarterly Water Analyses.

Indianapolis, Ind.—The state board of health plans making an analysis of each water supply in Indiana at least four times a year, according to the announcement of H. E. Barnard, state food and drug commissioner. A notice has been mailed to all superintendents of waterworks in every Indiana city, asking the officers of the municipalities to cooperate with the state authorities in a campaign to bring water supplies of Indiana cities up to standard.

Ice in Intake Pipe Stops Water Supply.

St. Joseph, Mich.—The water supply of this city has been entirely cut off for nearly three days. Slush ice has stopped up the intake pipe half a mile out in Lake Michigan and left the city without adequate fire protection. All schools have been closed and several manufacturing plants have suspended operations.

New Pump Satisfactory.

Globe, Ariz.—Mr. Cook, in charge of the city water department, has reported that the new Layne & Bowler pump, just installed by the city water department, is a great success. It is a turbine pump and has just been put in at the new well at the pumping plant. According to Mr. Cook the water authorities of the city have just finished making a 10-day test and the pump has been furnishing water at the rate of 650 gallons per minute.

Buy Land to Prevent Water Contamination.

Colorado Springs, Colo.—The city water department has purchased 160 acres of land just above the Halfway House on Pikes Peak. The land was bought for $2,000, which is considered a low price. It has two of the supply streams of the city's water department running across it. The land also has a reservoir site.

Open Dead Ends to Remove Sediment.

Milwaukee, Wis.—Believing that all sand in the city water, which has caused complaints of clogged meters, has been in the pipes for many years and does not come from the lake at the present time, Superintendent Bohmann of the water department is opening up the mains at all dead ends and allowing the water to flow for an hour or more. In one case so much sediment was found in the dead end of the pipes that it discolored the water of the river where it entered the stream. The work will be kept up all winter and Mr. Bohmann believes that when all the sediment is taken from the 500 miles of main all complaints will cease.

New Accounting System for Water Works.

Toledo, O.—A new system of bookkeeping, that will classify expenditures and make the records a constantly accurate statement, is being installed in the water works department. The work is being done by State Examiner Moul, of the Ohio bureau of accounting. According to Mr. Moul, Toledo is four years behind other cities in water works accounting. All accounts of the department are being examined and the revision of bookkeeping forms is being made during progress of the examination.

STREET LIGHTING AND POWER

Lighting System in Operation.

Lakeland, Fla.—Lakeland's great white way has been turned on in all its brilliance and Lakeland now bears the distinction of being the only town between Tampa and Jacksonville with a white way system. There are in the system over 4,200 feet of installation, sixty-three handsome iron standards, bearing five cluster lamps, each cluster giving out 340 candle power light, or 3,400 candle power to the block, there being an average of ten standards to each block, five on either side the street and about sixty to seventy feet apart. The globes of twelve and sixteen-inch diameter, are the best made by Macbeth Evans. The whole appearance is one of absolute uniformity and singular beauty.

More Lights at Gainesville, Tex.

Gainesville, Tex.—This city is already considered one of the best lighted cities of its size in Texas. Now its progressive City Council has closed a contract at its recent

meeting that will add just three times as many lights as formerly on all streets. The "White Way" on California street will remain as it is, but additional arc lights will be placed at every street intersection. On the residence streets two eighty-candle power lights will be put in on every block.

Ohio Standardizes Quality of Gas.

Chillicothe, O.—Chillicothe consumers, who have been petitioning Governor Cox for relief in their gas situation, have received word from the State public utilities commission that aid is in sight.

The commission will fix a natural gas standard for all the state, with which gas sold in any community must conform in quality, heat units and freedom from impurities.

Cincinnati citizens are complaining of low pressure and overcharge. The proposed standardization when completed by the commission will eliminate all such complaints.

Will Grade Police and Firemen.

Houston, Tex.—Policemen and firemen employed by the city of Houston look forward to several changes this year. All policemen will be given better hours to work and in time better salaries in proportion to the amount of work they do. All firemen will also be graded and will be placed upon a more equitable working basis with a graduated scale of from $65 to $80 per month. These changes are scheduled to be brought about by Mayor Campbell, who stated that he believed every fireman in the employ of the city should receive as much salary as a policeman, when they have demonstrated through experience, capability and obedience to duty, that they deserve it.

Fire Convention to Be Held in Schenectady, N. Y.

Schenectady, N. Y.—Arrangements have been completed to hold the annual convention of the New York State Fire Chiefs' Association in this city in June, the exact date to be decided upon later. The convention will last for two days and will bring from 150 to 200 fire chiefs here from many of the cities and towns in the State. Chief Yates, who is secretary of the State organization, expects to have the expenses raised for the convention without soliciting funds, but it is probable that the Board of Trade and the city will assist in providing for the entertainment of the chiefs.

Will Remove Alarm Box Keys.

Tucson, Ariz.—In order to put a stop to the false alarms which have been perpetrated during the past few weeks, Chief Harry Parker has decided to have the keys removed from 14 of the 22 fire boxes and placed in nearby houses which will be designated. The plan has been followed in the coast cities with success and it is believed that it will stop the practice of turning in false alarms. The rest of the boxes will be closely watched and a reward of $100 for the detection and conviction of the person caught turning in a false alarm will still be offered.

MOTOR VEHICLES

Seagrave Motor Truck Installed.

Meriden, Miss.—There is great rejoicing around at the Meridian fire department, Central station. The new auto truck has arrived and is a substantial addition to the equipment of the department. It is a Seagrave, the same make as the one that is now in use, an auto chemical combination, chemical and hose wagon, with six cylinders, eighty horse power machine, carrying fifteen hundred feet of hose. It is larger and wider than the old motor; has a Gray-Davidson self-starter, electric lights, electric sirene whistle, new departure rotary bell, twenty-foot extension ladder and twelve-foot roof ladder. It has two large three-gallon chemicals of latest type and a forty-gallon chemical tank.

Department Equipped With Brockway Truck.

Cortland, N. Y.—A new motor fire truck has been installed in the Central Fire Station, the Board of Fire Commissioners having purchased the apparatus from the Brockway Motor Truck Company of this city, with the understanding that the machine would perform satisfactory work. The truck is the same as was on the streets earlier in the winter months, but it has been equipped with a much more powerful engine. It carries 1,000 feet of hose and a forty-gallon chemical tank, in addition to the hand extinguishers.

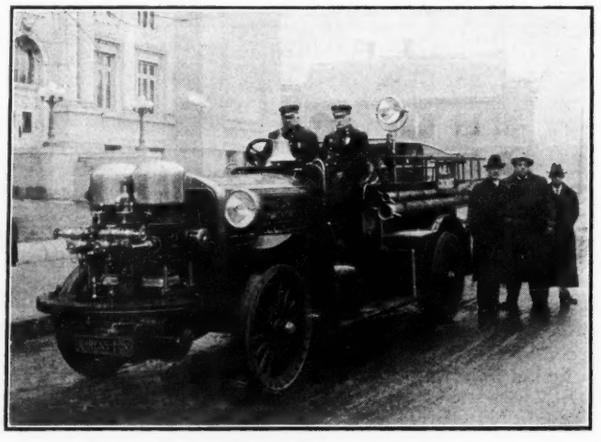
Accept American La France Machines.

Newport, R. I.—This city now has two pieces of automobile-driven fire apparatus and a chief's runabout. The new La France combination has been tried and accepted and put into commission. There seemed to be no criticism to be made, for the machine was apparently up to specifications in every particular.

Rock Hill, S. C.—Rockhill's new La France fire truck has arrived and was given a thorough tryout by Mr. Weeant, of Charlotte, and the firemen of the city. The truck is one of the latest La France models with a high grade engine and chemical equipment.

Ahrens-Fox Engine Received.

Lynn, Mass.—There was general regret expressed among the fire officials that the new and powerful gasoline pumping engine, the Ahrens-Fox, which arrived in the city, could not have been pressed into service at the Owens box factory fire. The officials felt that it would have given an excellent account of itself. The Ahrens-Fox comes here with the soundest reputation of any engine



Courtesy Lynn (Mass.) Daily Evening Item.
AHRENS-FOX PUMPING ENGINE.

which was exhibited in the recent New York fire apparatus show, when it withstood every test without a demerit. It cost the city $9,000, f. o. b. Lynn, and was ordered last November.

GOVERNMENT AND FINANCE

Mayor Acts As Purchasing Agent.

Elkhart, Ind.—While other cities are asking for purchasing agents Elkhart has appointed Mayor Smith its purchasing agent. Other cities do not seem to find provision in the statutes for such an official. Elkhart got one simply by having the board of works adopt the rule which made the mayor the purchasing agent for all city departments. "Every big private corporation has a purchasing department," said Mayor Smith, "and many of the cities of the country now have the same system. I will not make any purchases except those asked for by the heads of departments and sanctioned by the board of works."

Indebtedness Decreased Under Commission Rule.

Gulfport, Miss.—The city commissioners have made public the promised comparative financial report of the last year of aldermanic government in Gulfport and the first year of the commission form of municipal government. According to the figures presented by Auditor Crook, during the past year the indebtedness of the city has decreased $22,043.78, and there has been a saving of $6,240 in monthly pay rolls. "Attention," says the report, "is in-

vited to the fact that the gain above mentioned has been brought about without any increase in assessment values, while no doubt the property values of some individuals have been increased and others decreased, the total assessed value of real and personal property of the city as shown by the assessment tolls is $44,000 less in 1913 than in 1912."

For Three Commissioner Plan.

Rapid City, Mich.—Agitation of the question of reducing the city commission here from five to three members at the coming spring election has become a public debate and from present indications the change will be put into effect. This step has been suggested by the action of Sioux Falls, and other communities in the state, operating under the commission form of government, which have tested the five and then turned to the three commissioner plan. Aberdeen is now engaged in the same agitation and is figuring on reducing to three. Lead City adopted the three commissioner plan from the start and claims that it is entirely effective.

Commission Government Adopted.

Fort Scott, Kan.—By a majority of eight votes, Fort Scott has adopted the commission form of government after a vigorous campaign, in which the advocates of the new form were opposed by most of the present city officials. Voters registered numbered 4,900, but only 1,700 voted.

Antigo, Wis.—Commission government has won out, the vote being 498 for, and 192 against. The vote was very light, although considerable interest was manifested.

Defeat Commission Government.

Springfield, Mo.—A proposition to give this city the commission form of government has been defeated in the second special election held for that purpose within six months. The vote was 2,775 against and 2,674 for, giving the opposition a majority of 101 votes. Last October the proposition was defeated by 504 votes.

Marquette, Mich.—The people of the city of Negaunee have defeated the proposition to adopt the commission form of government. The plan has been rejected by 30 majority out of a total of 674 votes.

STREET CLEANING AND REFUSE DISPOSAL

Offer Little to Philadelphia for Waste.

Philadelphia, Pa.—Lack of confidence in what councils will do to protect them, served to discourage bidders for the privilege of sorting household waste collected by the city street cleaning contractors. The bids have been opened by Chief Connell of the highway bureau. The privilege is estimated to be worth at least $100,000. Chief Connell points out that New York receives $300,000 a year for the same privilege, Buffalo $60,000 and Washington $40,000. The highest direct bid received here was for $15,000. Contractors admitted to Chief Connell that they are afraid that councils will pass an ordinance protecting the ragmen and scavengers who now paw over the waste which is set out on the sidewalks for collection. If the scavengers are permitted to take away the best of the waste, the contract for taking it away from the dumps will be less valuable.

Daytime Sweeping More Efficient.

Jacksonville, Fla.—In keeping with the new plans for increasing the efficiency of the street cleaning department, W. C. West, superintendent, said that the new schedule for the sweeping and cleaning of residential streets by daylight is now being put in effect and, according to Commissioner of Public Works L. D. Smoot, every indication points to decided betterment in the service. Under the old arrangement, these residential streets as well as the crowded down town thoroughfares were swept at night. So far it has been found that the results obtained by daylight are far better and the streets can be swept much cleaner with the help of the sun than under the rays of street lights. Also a more comprehensive inspection has been made possible under daylight than at night. Under the present plan, a very large portion of those engaged in the sweeping and cleaning of the streets start to work at 3 o'clock in the morning and work until 2 in the afternoon, having, of course, an hour out of this time for their mid-day meal. By the same arrangement, too, most of this force is put to work on the main down town thoroughfares, where the business traffic is heaviest. By concentrating the employes on these main business thoroughfares at this early hour, it is possible to have them swept and cleaned by early in the morning, when the tide of heavy travel sets in for the day.

Incinerator in Operation.

Raleigh, N. C.—The city incinerator is in full blast. It is what is known as a "unit," and later there are to be two others added. It cost $3,500 complete, and is said to do as good work as plants costing $25,000 in some other places. An inspection showed that there is hardly any smoke except a faint wisp, and not a bit of odor.

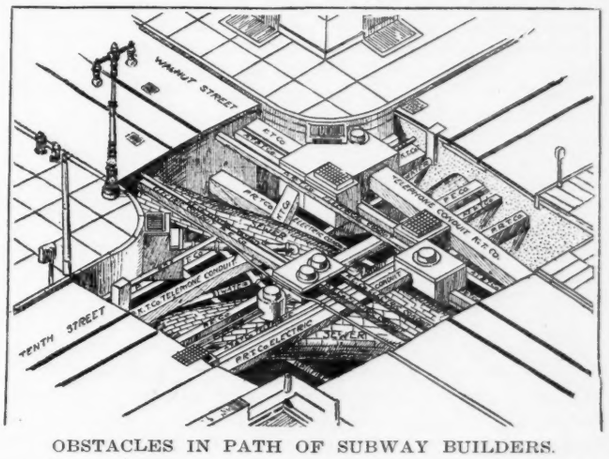
Will Cost $500,000 to Remove Snow.

New York, N. Y.—A severe snow storm has hit New York and crippled traffic very badly. It is estimated that fifteen and a half inches of snow have fallen. The work of removing the snow has been delayed and drifts have banked up along the gutters, impeding the moving of vehicles. It will cost about $500,000 to clear away the snow. Thousands of unemployed men have applied at Municipal Employment Bureau and found work with contractors' gangs.

RAPID TRANSIT

Many Obstructions in Subway Building.

Philadelphia, Pa.—An idea of the prodigious task that confronts the engineers, who will construct the Broad street subway and delivery loops, can be gained by a study of the structures that lie beneath the surface of the streets to be excavated. In the heart of the city there is a mass of sewers, telephone and other conduits, pipes and mains that lie directly in the path of the subway. These must not only be moved to make way for the tube, but the service they perform must be uninterrupted during the building of the subway. For instance, at Tenth and Walnut streets the conditions beneath the surface are typical of other sections



OBSTACLES IN PATH OF SUBWAY BUILDERS.

in the city's center. The recommended subway delivery loop will occupy Walnut street between Eighth and Fifteenth streets. At the street junction mentioned there exist brick sewers in both streets from three feet to six inches in diameter, with four inlets and their terra cotta pipe connections to the sewers, three water mains and service pipes from these mains, one high-pressure fire service main, four gas mains, one pneumatic mail tube, conduits of the Bell Telephone Company and of the Keystone Telephone Company, also of the Philadelphia Rapid Transit Company, Philadelphia Electric Company and the city electrical bureau, together with seven manholes and two valve boxes. Then there are various poles, fire hydrants and so on. All of these must be removed from the path of the subway and at the same time be kept in service. This will be particularly hard in the case of sewers which require grade to permit of gravity flow. While the relocating and

caring for these underground structures in a manner that will avoid any interruption of their use, seems a complicated undertaking, all will be provided for according to a well-ordered plan.

Rapid Transit in Berlin.

Berlin, Germany.—Berlin transportation interests are openly working to mould public opinion in favor of a merger of the street railway, subway and omnibus companies. Community of interest has already been arranged in many instances by the interchange of stock, so that the "Greater Berlin traffic combine" is almost in existence. Outside of the consolidation will remain, however, a few street car lines operated by the municipality and the state-owned elevated railways, and the financiers also face the possibility that the city might exercise its right to take over the various systems, which it might do in 1920 in the case of the street railways, and in 1927 in case of the subways. The municipality is threatening to exercise this right and is also discussing plans to take possession of the plants which generate electricity for general consumption in Berlin and its suburbs.

City Will Make Up Railway Deficit.

Cleveland, O.—The promised street car war here has been averted when the city and the Cleveland Railway Company agreed to raise the fare July 1, 1914. A charge of one cent for transfers will be made in addition to the three cents cash fare.

The city agreed to take care of a deficit of $217,000 in the railway company's maintenance fund, and allow the company to charge off during a period of five years $1,080,000, the reproduction value of obsolete equipment.

MISCELLANEOUS

Fog Prevention Experiment in Pittsburgh.

Pittsburgh, Pa.—An exhaustive report will soon be submitted to the city council and the bureau of health, recording the observations of scientists connected with the Mellon Institute, from experiments to prevent fogs in Pittsburgh. The French method used in Lyons, France, has been tried. It consists of covering the river with a thin film of oil which acts as a blanket and keeps the fog from enveloping the city in cold weather, for the humidity produced by the evaporation of the three rivers in Pittsburgh, is invisible in high temperature, but condenses and forms a fog as the thermometer lowers. The experiments have determined that a coating of oil of about .079 gallon per 113 acres of water will check a fog. Perhaps $28.95 per day will be the cost of maintaining this method during the average 62 days each year when Pittsburgh has no day light. The rivers in this city are rather swift flowing, so that trouble is anticipated in keeping the oil film in place.

Mayor Has Schedule For Official Visits.

Holyoke, Mass.—Mayor J. H. Woods has a new plan for office hours, and in addition to his previously announced afternoon hour will inaugurate a system of morning office hours for city officials only. He has adopted the following schedule for official visits: Police department, 8.45; city engineer, 9 o'clock; city clerk, 9.05; gas and electric department, 9.15; board of health, 9.25; city auditor, 9.35; city treasurer, 9.45; board of public works, 9.55; city almoner, 10 o'clock.

To Remodel Billboards.

St. Louis, Mo.—The city of St. Louis has won a partial victory in its fight with the bill companies when the general manager and the attorney of one of the large companies informed the building commissioner that it would remodel 250 billboards in St. Louis to conform to the city ordinance. This announcement came after years of fighting.

Chicago's Municipal Employment Bureau.

Chicago, Ill.—Operating under the board of health the municipal labor office has been successful in helping to positions about 229 men in four weeks. This has been accomplished in spite of the fact that employers at Chicago have been experiencing a slack season. Effective letters are being sent to business men and the replies received indicate the interest they have in co-operating with the employment bureau. The method used by the office in securing work is briefly given below:

When men apply to the labor office for work they are registered on a card showing their names, address, date, age, nationality, language and record of their previous work with notations as to references. On this card is also kept a record of the people to whom each man is referred for employment. When an employer calls up the office and wants to hire a man, the labor agent refers to his file, choosing one or two men who he thinks will fill the job. The men are given reference slips from the agency to the employer and sent out at once, provided they are in the office at the time. In cases where the right man is not in the office when the call comes, and he lives outside the lodging house, a post card is sent to his home at once asking him to report. If he lives inside the lodging house a notice is posted on the bulletin board, asking him to report to the office. The labor office endeavors to choose the man who will best fit the requirements of the position vacant. If the first man sent is not satisfactory, the office will immediately send somebody else.

Present Pulmotor to City.

Sheboygan, Wis.—The Sheboygan Railway & Electric company has presented its pulmotor to the city. The gift was accepted by Mayor Dieckmann on behalf of the city. The pulmotor has been placed at the police station where someone is always on duty who knows how to operate it and where it can be secured on instant notice.

Want to Merge Two Cities.

Attalia, Ala.—At a meeting of the citizens of Attalia, a resolution has been passed, requesting Mayor Russell to appoint two men as a committee to confer with a like committee of Alabama City citizens, for the purpose of formulating plans for the amalgamation of Alabama City and Attalia into one city. It is believed the movement will receive the indorsement of the majority of the citizens of both places.

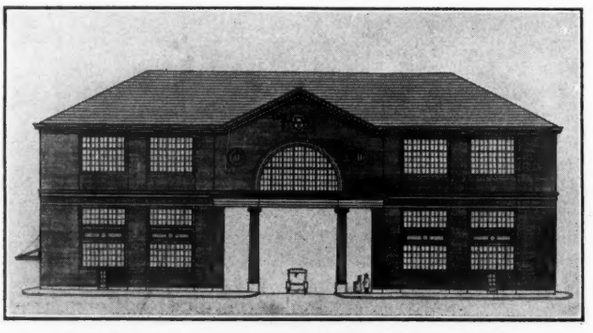
Purchase Park.

Evansville, Ind.—Mayor Benjamin Bosse has announced that the city had bought the noted Garvin Park here for $50,000. The park contains seventy-nine acres and is one of the most beautiful spots in Southern Indiana.

New Municipal Market in Pittsburg.

Pittsburgh, Pa.—In addition to erecting a $3,000,000 city hall, Pittsburgh has decided upon plans for constructing a new market house to cost $300,000, submitted by Architects Rutan & Russell. Work is to be started immediately. The new building will occupy the same ground as the present East and West structures. Following is a description of the new market:

The first floor is divided into four sections with an aggregate area of 11,000 square feet, which is sufficient to accommodate nearly all the fresh meat and fish stands now located in the market. Above this first floor is a mezzanine of equal area, which will afford a means for providing cold storage rooms for the various stall holders. The second floor will be the full area of the respective east and west lots and here will be the general market. It will be reached by four commodious elevators. The area of the second floor will be approximately 22,000 square feet. In the rear of each of the two main buildings are located the receiving rooms for the handling of all the stuff that is for sale and each room is provided with two large freight elevators. In the basement will be placed the heating apparatus and refrigerating plant. The exterior will be of brick and terra cotta with a slate roof. The interior walls will be lined with light gray brick. Everything will be fireproof and all details will be arranged so as to limit the possibility of rats and to afford the greatest facility for maintaining the highest sanitary conditions.



FRONT ELEVATION OF PITTSBURGH'S MUNICIPAL MARKET.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Falling of Billboard—Liability of City.

Shippey vs. Kansas City.—Where a city fails to exercise ordinary care to ascertain whether the supports of a billboard near the edge of a sidewalk have decayed and become inadequate to support the board, it is guilty of negligence, rendering it liable for injuries to a pedestrian on the sidewalk from the falling of the board.—Supreme Court of Missouri, 162 S. W. R. 137.

Defective Street—Injuries—Negligence.

City of Covington vs. Westbay.—A passenger who, when alighting from a street car, steps into a hole in the street is not, as a matter of law, guilty of contributory negligence precluding a recovery from the city, where the accident happened between 6 and 7 o'clock, and there was some evidence that street lights were burning, since passengers are expected to leave cars with reasonable dispatch, and need not anticipate that cars will stop at a place where it is not reasonably safe to alight, but may assume that the street is reasonably safe.—Court of Appeals of Kentucky, 162 S. W. R. 91.

Flushing Street—Governmental Function.

O'Daly vs. City of Louisville.—A fireman of a city fire department engaged in flushing the street in front of an engine house is engaged in a work reasonably necessary for the prudent operation of the department, and a pedestrian injured by the bursting of the hose may not recover from the city for the negligence of the fireman; the city exercising a governmental function.—Court of Appeals of Kentucky, 162 S. W. R. 79.

Street Improvement—Remonstrance—Rebates.

McKim vs. City of Independence et al.—Evidence held to warrant a finding that a contractor for a street improvement paid rebates to induce property owners to withdraw their remonstrance against the improvement, in order that the same might be made, so that tax bills issued to pay for the improvement were therefore void. Kansas City Court of Appeals, 162 S. W. R. 326.

Municipal Regulation of Express Companies.

William N. Barrett, as President of the Adams Express Company, etc., Appt., vs. City of New York et al.—The requirement of a municipal ordinance that every owner of a public express must give a bond "for each and every vehicle licensed," to be conditioned "for the safe and prompt delivery of all baggage, packages," etc., intrusted to the owner or driver "of any such licensed express," must fall, as applied to the interstate business of an express company, with the invalid provisions of such ordinance, under which the obtaining of a local license may be made a condition precedent to the transaction within the city by the express company of its interstate business.—United States Supreme Court, 34 S. C. R. 203.

Payment for Public Improvements—Right to Enjoin.

Nelson et al. (Parmelee, Intervener) v. City of Florence et al.—Where a taxpayer, in an action such as that last described, because of the alleged inferiority of material used in the pavement of a street, and because of alleged defects in workmanship, seeks to enjoin the payment for the construction of the improvement, he will be required to bring his action before the contractor has invested his money and finished his work, and if he waits until the work is completed and the city is in the full enjoyment of the improvement, and the equities of the case have been fairly considered by the trial court, the findings and judgment of such trial court will not be disturbed because of alleged irregularities in the letting of the contract or slight defects in construction, provided that the work itself is a substantial compliance with the contract.—Supreme Court of Nebraska, 144 N. W. R. 971.

Streets—Rights of Abutting Owner—Vaults.

Lincoln Safe Deposit Co. v. City of New York et al.—An abutting owner who did not own the fee, which was vested in the city of New York, is entitled merely to the easements of air, light, and access, and lateral support, except as to excavations made for street purposes, and hence cannot complain that the city allowed the street to be used for a subway, even though that, properly speaking, might not be considered a street purpose. Public grants such as a license for an abutter to use a street the fee of which was owned by the city, must be construed strictly against the grantee. The Legislature can authorize the acquisition of such title to land taken for public use, as for streets, that no right will remain in the original owner. Where a municipality owned the fee of a street, a permit for an abutting owner to maintain a vault therein does not give him a right in perpetuity, but his license may be revoked whenever for the benefit of the public; hence the city may revoke the permit when it is necessary in order to construct a subway.—Court of Appeals of New York, 103 N. E. R. 768.

Injury—Defective Steps—Amount of Award.

Board of Council of City of Frankfort v. Kirby.—Where, in an action for injuries to a pedestrian, while passing down certain stone steps leading from one street to another, it was shown that plaintiff was caused to fall by the fact that one of the stones was loose and tilted when he bore his weight thereon, it was immaterial whether the negligence of the city consisted of an inherent defect in the construction of the steps or whether it was a mere failure to keep them in proper repair. Plaintiff, at the time of his injury, was 58 years of age, in good health, and earning $2 a day, though he was not regularly employed. He was permanently injured, and there was evidence that he suffered greatly and that it was probable that his earning capacity for the rest of his life had been completely destroyed. Held, that a verdict allowing him $3,500 was not excessive.—Court of Appeals of Kentucky, 161 S. W. R. 1115.

Liability to Assessment—Presumption of Purchaser's Notice.

Richards v. Barber Asphalt Paving Co.—Ky. St. § 2834, part of the charter of the city of Louisville, provides for a lien on abutting property for the cost of original improvements of streets and for its enforcement by court proceedings, and that no error in the proceedings of the council shall exempt from payment after the work has been done as required by either the ordinance or contract, but that the council or the court shall make all corrections and orders to do justice between the parties. Defendant knew of an improvement at the time he purchased property upon which the assessment had apparently been paid. Held, that it must be presumed that he had knowledge of the statute, and hence he was not an innocent purchaser for value without notice, but, under its express provisions, was liable to an additional assessment, resulting from a decrease in the assessment territory ordered by the court and a consequent increase in the assessment against property remaining within the district.—Court of Appeals of Kentucky, 161 S. W. R. 1105.

Vacation of Streets—Rights of Abutting Owners.

City and County of San Francisco v. Main et al.—San Francisco in 1876 both formally and physically closed a certain street and maintained adverse possession of the lands formerly occupied by the street to the exclusion of defendant, an abutting property owner, and her predecessors in interest from the exercise of any right or easement therein, which exclusion continued for at least ten years, during all of which time defendant took no action to assert her easement over the property. During this period the city erected public buildings thereon and constructed valuable and permanent improvements on the land, the destruction or removal of which would be required to afford defendant a right of way over the land. Held, that defendant's right either to an easement over the land or to recover damages for the taking of such easement was barred by limitations.—District Court of Appeal, 137 P. R. 281.

NEWS OF THE SOCIETIES

Calendar of Meetings.

February 18-20.
IOWA ENGINEERING SOCIETY.—Annual Meeting, Council Bluffs, Ia. S. M. Woodward, Secretary, Iowa City, Ia.
February 24-25.
MINNESOTA ENGINEERS' AND SURVEYORS' SOCIETY.—Annual Meeting, St. Paul, Minn. Wm. Danforth, President, 411 Hackney Building, St. Paul, Minn.
February 26-27.
INDIANA SANITARY AND WATER SUPPLY ASSOCIATION.—Seventh annual meeting, Hotel Severin, Indianapolis, Ind. Dr. W. F. King, Secretary, Indianapolis.
February 26-28.
HIGHWAY ENGINEERS ASSOCIATION OF MISSOURI.—Annual Meeting, St. Joseph. Ray L. Gargill, secretary, St. Joseph.
March 9-11.
ILLINOIS WATER-SUPPLY ASSOCIATION.—Annual Meeting, Urbana, Ill. Edward Bartow, secretary, Urbana.
March 12.
VERMONT SOCIETY OF ENGINEERS.—Annual Meeting, Burlington, Vt. George Reed, secretary, Barre.
April 16-17.
TRI-STATE WATER AND LIGHT ASSOCIATION.—Annual Convention, Atlanta, Ga. F. C. Wyse, assistant secretary, Columbia, S. C.
May 11-15.
AMERICAN WATER WORKS ASSOCIATION.—Thirty-fourth Annual Meeting, Philadelphia, Pa. J. M. Diven, secretary, 47 State street, Troy, N. Y.

Iowa Engineering Society.

The program of the twenty-sixth annual meeting, Grand Hotel, Council Bluffs, February 18-20, is as follows:

WEDNESDAY, FEBRUARY 18.

7.30 P. M.—Organization; address of welcome, Thomas Maloney, mayor of Council Bluffs; response; discussion of final report of committee on highway bridge specifications; discussion on a license law for engineers; discussion on report of the legislative committee.

THURSDAY, FEBRUARY 19.

9.00 P. M.—Report of committee on surveying and drainage, J. H. Mayne; report of committee on roads and pavements, T. H. McDonald; report of committee on sanitary engineering, A. Marston; "The Imhoff Tank and Its Use in Iowa," M. G. Hall; "Approval of Water Supply and Sewage Plans by the State Board of Health," Lafayette Higgins; appointment of committees.

2.00 P. M.—"The Commercial Value of the Keokuk Dam to Iowa and the Mississippi Valley," G. Walter Barr; "Agricultural Engineering," J. B. Davidson; "A State Public Utilities Commission," Charles P. Chase; "An Iowa Building Code, a Report of the Committee on Structural Engineering," James A. G. Sweimler; reception at Commercial Club, 8.00 P. M.

FRIDAY, FEBRUARY 20.

9.00 A. M.—Business session; report of secretary-treasurer; report of executive committee; general business; "The New Assessment Law for Street Improvements," Robert Brennan, city attorney of Des Moines; "The Operation of the Last Highway Law and Desirable Amendments," Henry E. Sampson, Attorney General's office, Des Moines; "Bituminous Coated Concrete Paving," J. G. Thorne.

8.00 P. M.—Members are invited to an entertainment at the Armory to be given by the Knights of the Full Moon.

County Judges and Commissioners Association of Texas.

The forty-fourth convention was opened at Dallas, Feb. 6. The entire first day was given to the discussion of roads. Sessions were presided over by J. B. Haynes, county judge of Johnson county. Rosser Thomas, county judge of Farnum county, spoke on "What We Gain by Having Good Roads." The following members spoke on "Good Roads and How to Get Them": J. T. Miller, County Commissioner of Dallas County; R. H. Bratton, County Judge of Tarrant County; M. J. Delk, County Commissioner of Ellis County; J. M. Woods, County Judge of Guadalupe County, and Richard Critz, County Judge of Williamson County. All of these counties have been leaders in the development of good roads systems and many interesting points were brought out as to how to secure money, cultivate popular sentiment favoring good roads bond issues and other problems the county official must meet.

Another phase of road building which is in the reach of all counties, whether they can raise bond issues for systems of macadam or paved roads or not, was taken up in the second general discussion of the day, dealing with "How to Build and Maintain Dirt Roads." The uses of the split log drag, of the sandclay road and the value of simple grading of dirt roads were explained by W. E. Hunnicutt, County Judge of Falls County; H. L. Davis, County Judge of Collin County; T. J. North, County Judge of Baylor County, and George B. Hall, County Judge of Hunt County.

After these general discussions, a motion was made and carried that the convention invite J. F. Witt, County Engineer of Dallas County, to make a talk upon the practical engineering of road building. The motion was carried unanimously, the sentiment being expressed that the convention needed practical instruction of that sort as discussion of the benefits and financing of roads, if no more. Mr. Witt accepted the invitaton and talked for nearly an hour, explaning the various kinds of roads, their adaptations for various uses and conditions and the best methods to be followed for heavy traffic and light traffic roads. He also described at length the development of the road system of Dallas County, of which he had had charge, and told of the experiences of the county with gravel, macadam and paved roads. His talk was received with much apparent interest.

Nebraska State Firemen's Association.

The annual meeting was held at Columbus January 23. The following officers were elected:

George Howe of Fremont, president, elected unanimously; H. A. Graff, Seward, first vice president; J. P. Hoffman, Ord, second vice president; E. A. Miller of Kearney, who has served as secretary fifteen years, re-elected without opposition; Fred Alexander of Scottsbluff, re-elected treasurer. The following were elected as a board of control: H. Hauser, Fremont, chairman; Jacob Goehring, Seward; E. W. Parkhurst, Lexington; Ray Frost, Stanton, and Thomas Jeffrey, North Platte.

Former President Tracy read a paper on fire alarm equipment and recommended a telephone system to report fires. Mr. Neuberger of West Point demonstrated a non-explosive gasoline can. Former State Fire Commissioner C. A. Randall addressed the convention on fire prevention. Mr. Boyce of Hebron read a paper on the duties of the fire department, stating that Hebron had had only one fire, owing to fire prevention measures. Mr. Rouney of Alliance spoke on the relationship of the fire chief to volunteers.

Nebraska Municipal League.

The fifth annual convention was held at the city hall Tremont, February 4-6. The following program was carried out:

Wednesday, February 4—4 p. m., registration of delegates; 4:30 p. m., annual address, President George F. Wolz, "Legislation Secured and What We Need." Report of the secretary-treasurer, R. C. Ozman, Lincoln, Neb. Appointment of committees: (a) Question box; (b) Resolutions; (c) Nominating. Recess until evening, 7:30 p. m., words of welcome by Hon. R. M. Herre, mayor of Fremont; response, Councilman E. Bossemeyer, vice president Nebraska League; address, "Disposal of Garbage in Large and Small Cities," by John J. Rider, commissioner, Omaha. Discussion of address, opened by Adna Dobson, city engineer of Lincoln, and H. W. Kibbey, engineer of Grand Island.

Thursday, February 5—9:30 a. m., address, "Vitalizing Municipal Economics," by E. C. Hurd of Lincoln. Discussion opened by B. W. Benson of Central City, giving views on the union of water, light, heat and ice plants in one. Further discussion by H. M. Robertson, light and water superintendent of Wahoo; 11 a. m., address, "Recent Development in Municipal Government," by Frank G. Pierce, secretary of Iowa League of Municipalities, Marshalltown, Ia. Discussion led by A. E. Sheldon, State Legislative Reference Bureau; 2 p. m., address, "Methods of Extinguishing Fires and How Equipment Effects Insurance." Discussion, led by J. W. Calder, mayor of Seward, and Mayor F. W. Noh of Clarkson. (Demonstrations by Fremont Fire Department); 4 p. m., visit to the Fremont municipal water, light and heating plant and a trip around the city; 6:30 p. m., banquet, followed by an illustrated lecture, "Parks and City Planning," Prof. E. H. Barbour, Nebraska State University. Discussion, led by E. H. Evans, mayor of North Platte, and J. A. Richardson, commissioner, Nebraska City.

Friday, February 6—9:30 a. m., address, "Necessity and Ways of Paying Off Bonded Indebtedness," E. R. Gurney, president First National Bank of Fremont. Discussion opened by George Dayton, commissioner of Lincoln, and Mayor J. W. Meyer of Beatrice; 11 a. m., Question box committee report and discussion; 1:30 p. m., unfinished business, election of officers; selection of next convention place.

The following officers were elected: President, George F. Wolz, Fremont; vice president, John W. Mayer, Beatrice; secretary-treasurer, Roscoe C. Ozman, Lincoln; trustees, R. M. Herre, Fremont; Dan McLeod, Schuyler; W. R. Tasber, Tecumseh.

Southeastern Sanitary Association.

After the announcement from Cressy L. Wilbur, M. D., chief statistician, bureau of the census, that the Legislature of South Carolina would probably pass an adequate vital statistics law at this session, and addresses on malaria, hookworm, medical inspection of schools and commercial disinfectants, the Southeastern Sanitary Association closed its convention at Columbia, S. C., February 13, with the election of officers for the ensuing year. The points that were brought up in the address and the information gained by the interchange of ideas were considered sufficient grounds for the continuation of the Association. Methods for a campaign, in which the aims of the Association would be disseminated throughout Southeastern States, was also discussed.

The officers elected for the ensuing year are: J. La Bruce Ward, M. D., of Columbia, S. C., director of rural sanitation under the Rockefeller commission for the study of hookworm, president; C. E. Torry, M. D., city health officer of Jacksonville, Fla., vice president, and Clarence E. Smith, D. V. S., of Greenville, S. C., re-elected, secretary and treasurer.

Kentucky Road Engineers' Association.

The association, at a meeting at Frankfort, February 6, went on record as favoring the bills to revise the present road law and levy a tax of 5 cents for state aid in road building, to use the motor vehicle license tax fund. To supplement this, the election of county engineers by the Fiscal Courts and an amendment to House Bill 162, revising the road law, to provide that dirt roads must be completed by October 1 instead of July 1. They also adopted a resolution favoring a four-year term instead of two for road engineers, and making the term begin January 1 instead of October 1.

Before adjourning, the engineers adopted resolutions thanking the state commissioner of roads, R. C. Terrell, and his department for aid given:

"We wish to emphasize the fact that this department has been so conducted as to meet with our hearty indorsement, and it is the sense of this body that the passage of any law or laws which curtail or hamper the activities of this department is to be deplored as a step backward."

The following officers were elected: Guthrie Wilson, Nelson county, president; Jacob Strous, Larue county; W. H. Edwards, Woodford county, and W. P. Caldwell, Boyle county, vice-presidents; J. G. Baxter, Madison county, secretary, and R. C. Terrell, J. R. M. Gaines, Jefferson county; W. B. Paynter, Anderson county; R. S. Davis, Fayette county; J. R. Thompson, McCracken county; M. G. Sullivan, Whitley county, executive committee.

The topics discussed were the following: Legislation for Good Roads, Good Roads from the Agriculturists' Standpoint, Earth Road Construction and Maintenance, The Relation of Good Roads to Educational Progress, Importance and Methods of Drainage, Sand-Clay Roads, The Care and Use of Road Machinery, Co-operation Among Highway Officials, The Construction, Maintenance and Repair of Macadam Roads, Arousing Sentiment and Future of Good Roads, Economical side of Roads and Road Building, Construction and Repair of Gravel Roads, Contract Letting and Design of Highway Bridges, and Obtaining Efficiency in County Organizations.

Michigan Association of County Drainage Commissioners.

The annual meeting was held in the Association of Commerce rooms, Grand Rapids, Mich., February 3-5.

The program was as follows:

February 4—Paper, "The Advantage of Tile Drains Over Open Drains," Fred Milbourn, Eaton county; discussion, led by E. G. Hulse, C. S. St. Johns and L. C. Williams, Calhoun; address, "Relation of County Drains to Public Health and Sewage Disposals," E. D. Rich, state sanitary engineer; address, Senator William M. Smith, St. Johns; election of officers.

February 5—Paper, "What Constitutes a Proper Outlook for County Drains," E. W. Redman, Gratiot county; discussion, led by D. C. Thompson, Kalamazoo county, and A. J. Roberts, Lenawee county; paper, "The Drain Contract, Its Form," Elisha Strong, Ionia county; discussion, led by W. R. Carven, Ingham county. A trip through the Grand Rapids filtration plant, Walter Sperry, chemist in charge.

The officers of the association are: President, Louis F. Green, of St. Johns; vice-president, D. C. Thompson, Mattawan; secretary-treasurer, Jesse B. Pickett, Caledonia.

Engineers Society of Erie, Pa.

At the annual meeting, Jan. 14, the following officers were elected and installed as follows: President, L. V. Metz; first vice-president, M. C. Goodspeed; second vice-president, J. S. Dunwoody; secretary, William Fawcett; treasurer, W. H. Reynolds; director, James A. Evans.

New York Conference of Mayors.

A Municipal Information Service for the cities of New York state has been organized by the Municipal Bureau Council of the State Conference of Mayors. This service is to supply the needs of city officials while the conference is establishing a permanent State Municipal Bureau and to demonstrate just what can be done for municipalities through a clearing house.

The City Bureau will furnish information about municipal problems and the Albany Bureau of the Municipal Government Association will keep city officials posted about municipal information. The three organizations will work jointly for any municipal legislation or movement that each body approves.

Former Mayor Edward Schoeneck of Syracuse, chairman of the council, in a statement sent to the mayors of the state, says the service will endeavor either to send to city officials the latest and best information on any general municipal problem or to inform officials where such information may be obtained. The legislative service will consist of a weekly report to each city of all municipal bills and their provisions introduced the previous week.

Maine Roads Convention.

Great preparations are in progress at the office of the State Highway Commission for the state roads convention which will be held at Bangor, April 7 and 8, and which will last two or three days. This convention is called primarily to give an opportunity for the members of the highway commission to meet the local officials and discuss the year's work with them. It is planned to make the convention as educational as possible, and to this end material and machinery manufacturers have been invited to make exhibits. A dozen representatives of this kind have been invited to make exhibits. A dozen representatives of this kind have signified their intention of being present.

The State Grange and the Maine Automobile Association, through their officers have promised to cooperate in making the convention a success, and addresses will be delivered by officers of each of these organizations. It is also hoped to have addresses from representatives of the office of the Public Roads Department at Washington. The highway commissioners of New Hampshire, Vermont and Massachusetts are expected to give addresses so that the road builders in Maine may have an idea what the other New England states are doing in this line.

Not the least interesting feature of the convention will be several illustrated lectures on improved road and bridge construction by engineers thoroughly conversant with their subject. Arrangements have also been made for the loan of four sets of moving picture films which will show all the operation in the preparation of material for use in the construction of modern highways, together with all the steps in the construction of all highways. The Bangor Chamber of Commerce is cooperating with the commission to make the meeting a success.

(Continued on page 260.)

NEW APPLIANCES

SEWER CLEANING MACHINE.

Drawn by Cable and Roted by Hydraulic Power—Cleans Sewers at Small Cost.

The sewer-cleaning machine made by the Improved Sewer Cleaning Machine Company, 334 Twelfth street, Milwaukee, Wis., consists of a worm rotated at a high speed by the pressure of water conveyed to it through a pipe. This worm and the structure carrying it is pulled through the sewer from the manhole to another by a cable operated by windlasses placed on the street near the manholes at the ends of the section of sewer which is undergoing the cleaning process.

Referring to the illustration of the worm conveyor, No. 1 is the eye to which the cable is attached which pulls the machine through the sewer. No. 2 is the hose connection carrying water which turns the revolving device. No. 3 is the rollers and extensions for enlarging. No. 4 is the bolt which is only necessary to remove for extensions. No. 5 is the worm conveyor. No. 6 is a slot and spring whose function it is to permit the conveyor moving in and out over bad joints. No. 7 is a connection for the forward end of the conveyor. No. 8 is a plate for removing conveyor. Screws are taken out, plate removed, and power wheel and pinion lifted out for cleaning. No. 9 is a plate that protects the gears and miters. No. 10 is the cotter pin. No. 11, long nut. No. 12, lock nut. No. 13, nut with ball bearing.

The windlasses as shown have steel frames and are mounted on wheels. The drums and shafting are demountable. They can be moved behind a wagon; it is not necessary to load them on the truck. Each drum carries 450 feet of 6-strand 19-wire cast steel cable. No. 2 in this illustration is an extra drum for the hose to roll over while moving down into the sewer.

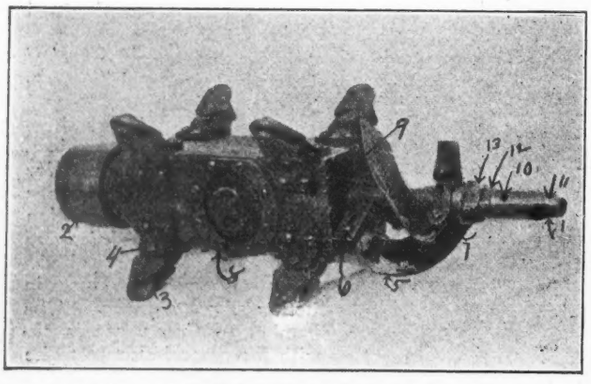
The manufacturers state that three laborers on a one-horse wagon can clean city sewers at an average cost of three cents per linear foot.

ATLANTIC PUMPING ENGINES.

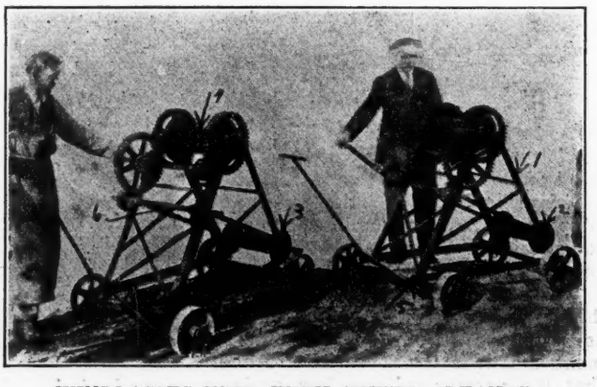
No contractor carrying on work underground can avoid the unwelcome expense of pumping water, water which usually carries so much mud with it that only special pumps will handle it. The old-fashioned way was to put a man or two to work on a diaphragm sewer pump with a long handle. The Empire City Subway Company, which lays many miles of conduits and cables in New York City, carrying on operations at many points and under many circumstances, have solved the problem of unwatering trenches in a way very satisfactory to themselves and, they believe, at a minimum expense. In the fall of 1911 the company purchased three Atlantic pumping engines, in May of the following year, three more; in October another, and last spring four more. The illustration shows nine of these pumps laid up for the winter when no construction is carried on at the yard, 49th street and Twelfth avenue, New York City. When in use, each pump saves at least one man a day, generally two, a day and a night man, and if there is a large amount of water in the trench perhaps four, as no man can pump in the same time as many gallons as the Atlantic engine can.

These pumps require little or no attention outside of the occasional renewing of a diaphragm. They are easily moved about, even over rough ground, by one man. The amount of water they are called on to remove is surprising, particularly where trenches are being dug near the water front. On one occasion three pumps were in operation for about two weeks. On this occasion they won a right to their name—Atlantic pumping engine—for it was the water from the harbor that they were pumping out of the excavation. The first one of the pumps on this job operated for two weeks steadily day and night without any stops, except for the renewal of a diaphragm.

ATLANTIC PUMPING ENGINES IN CONTRACTOR'S YARD.



ROTATING MEMBER OF SEWER CLEANER.



WINDLASSES USED WITH SEWER CLEANER.

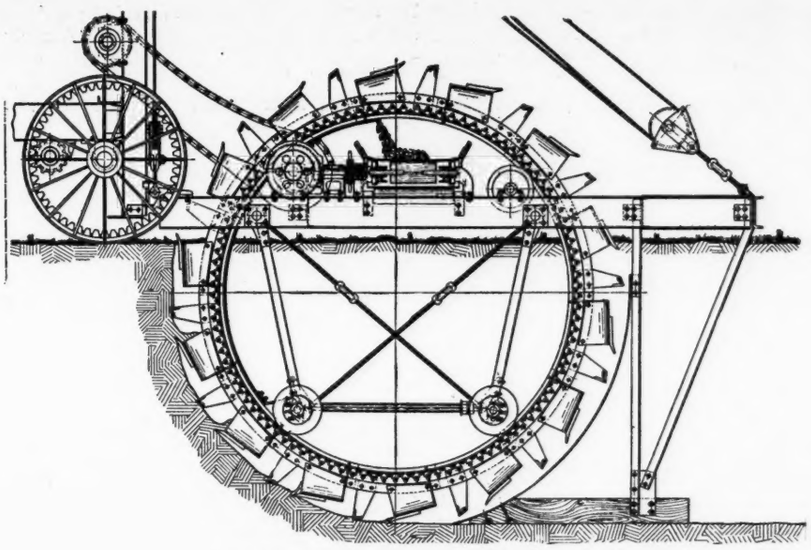


DIAGRAM OF P. & H. EXCAVATOR.

P. & H. EXCAVATOR.

Digs Trenches For Three Cents Per Lineal Foot and Avoids Pipes and Obstructions.

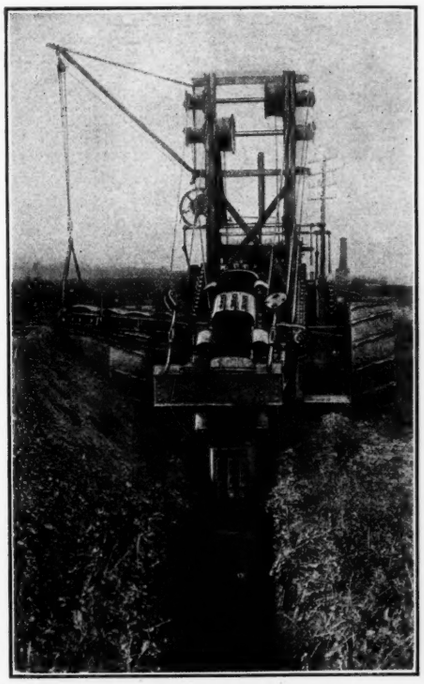
Pawling & Harnischfeger Company, Milwaukee, Wis., have placed on the market a line of trench excavators of the open wheel type. It is generally admitted that in trenches up to twelve feet in depth this type of excavator is the best. There are few moving parts on the operating wheel and sand, grit and stones cannot get into the working parts and cause breakdowns. The new P. & H. machines are sold under a guarantee to excavate at least three lineal feet per minute in a trench three feet deep, in ordinary earth, that can be dug with a spade and is free from shale, rock or other serious obstructions. Excavators of this sort generally cost not over three cents per lineal foot.

The buckets on the rim of the wheel excavate the dirt and when they reach the top deposit it on a belt conveyor which in turn drops it on either side of the trench and at any desired distance from it. The conveyor can be shifted from one side to the other without stopping the machine.

The P. & H. trench excavator is built almost entirely of steel. All high speed chains are of the hardened steel roller type. Gears are cut steel. The motor, of the internal combustion type, will burn kerosene, distillate, motor spirits or gasoline. As an alternative a steam plant is provided. The main frame is I beam steel. Reverse gears are enclosed and run in oil.

The excavating wheel is constructed of wrought steel plates properly formed and rigidly fastened together. The buckets are of boiler steel and have teeth of tool steel. Hard steel clearance cutters are also provided and are bolted to the wheel by four bolts instead of two as is common. The cog-racks and pinions are of steel. The excavating wheels on the contractors' machines and the larger drainage types are driven by two chains, one on each side, thus equalizing the pull on the wheel and insuring freedom of the wheel from any tendency to side-sway.

The excavating wheel is mounted in a very rigid, trussed, pin jointed frame and provided with adjustable trusses so that the guide rollers can, at all times, be easily kept in proper relation to the wheel. There being no



EXCAVATOR IN OPERATION.

axle, it is impossible to clog the wheel with earth from caving banks. A shield can be attached to the wheel frame and pipe laid directly behind the machine even where the banks have a tendency to cave in. The wheel frame is raised and lowered by means of power hoists, though an auxiliary hand hoist is provided for following grade lines or for emergency. The wheel may be lowered or raised while the machine is running, thus enabling the operator to miss service pipes or other obstructions in streets. The conveyor may be operated from either side since it may be slid through the wheel without dismantling.

The conveyor frame is jointed and may be tilted to an angle of 30 degrees when passing obstructions. Driving gears are covered to prevent dirt from getting into them. A friction slip is provided to prevent breakage of conveyor belt or chains in case a large rock or other material on the conveyor encounters an obstruction.

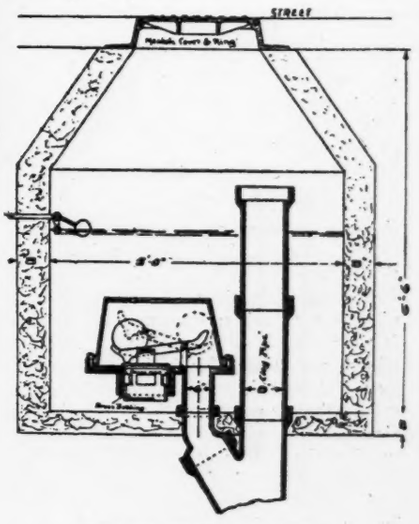
"P. & H." machines are provided with a sliding gear arrangement permitting six different speeds (from 1¾ to 5½ feet per minute) of the wheel feed. This device has proved extremely valuable, in that it permits the machine to be used at the maximum speed, consistent with the material being handled.

All operating levers are placed within easy reach of the operator, who stands at the side of the machine, where he has ample opportunity for full view of all working parts of the machine as well as the digging wheel. These levers are all of extra size and are very easily operated.

Where conditions require it, "caterpillar" traction wheels can be used, and excavators provided with these will be furnished.

ISHAM FLUSH TANK.

The Isham Flush Tank Company, 4609 14th avenue, N. W., Seattle, has placed on the market a flush tank which is said to be scientifically designed and practically tested to meet the most exacting requirements. The regulation is by ball valve. Very little fall is required to the sewer. No air is required for its operation. The parts are said to be adjusted with great accuracy. The working parts can be put in through any standard manhole ring. When the water rises in the flush tank to the proper level, the ball in the small tank rises, opening the valve and the water is let out into the sewer. The riser pipe is clay. The valve housing is set into the iron tank with a brass bushing.



ISHAM FLUSH TANK.

INDUSTRIAL NEWS

Cast Iron Pipe.—Operations are about normal and stocks are not accumulating to any great extent. Quotations: 4-inch, $22; 6-inch and up, $20. New York. Much more business is being done. A large tonnage has been placed privately. Quotations: 6-inch, $22 to $23.

Lead.—Prices are soft at 4.15c New York and 4.05c St. Louis.

Watson Dumping Wagons.

Twenty-six years ago the first Watson bottom dumping wagon was built. At the present time the Watson factory at Canastota, N. Y., is the largest in the world devoted exclusively to the manufacture of dumping wagons. These facts are mentioned in the recently-issued catalogue which describes in detail the different styles of wagons made, and characteristic elements in construction common to all. The Watson line includes the following: Standard grading wagon of 1½ and 2 yards capacity, which have high clearance to prevent their stalling on the dump. An extension upper box may be added to the latter, increasing its capacity to 3 yards. The asphalt wagon is another type. This is built for the sole purpose of handling hot paving mixtures, lined with steel and interlined with asbestos. The Barber Company has used these for twenty years and the Warren Bros. and their licensees have used about a thousand of them. One of the newest of the Watson family is the wagon for traction hauling. For hauling ashes and refuse a 5-yard body with flaring top and hinged drop wings is made.

Among the details of construction common to all Watson wagons, the new catalogue points to the substantial wooden bottoms braced with iron, the dovetailed sideboards and ends, the new double shaft winding device, the front end reinforcement, the wheels and the painting.

Clay Products.—The California Brick Company, Decoto, Cal., announce that they have opened a general sales office at 630 Phelan Building, San Francisco, Cal. The office will be in charge of L. R. McKenzie, sales manager. Claude E. Fuller is the general manager. The company manufactures vitrified paving block and brick, face pavers, step brick, dry-pressed face brick, sewer brick, coal burned clinker brick, fire brick, common brick, fireproof wall tile, hollow ware, flue lining—in fact, a full line of clay products.

Strickler Pipe Cutter.—Referring to the illustration of the Strickler pipe cutter on page 120, Municipal Journal, the manufacturers, W. W. Strickler & Brothers, Columbus, O., state that the picture was taken on one of the main feeders of the local gas company where a section of a 12-inch steel pipe was cut out in order to make some quick changes. Less than 6 inches of clearance was dug out under the pipe to give the cutter room to operate, and the cut was made in about ten minutes and was a clean square cut that didn't have a sign of a burr or ragged edge.

Road Machinery.—The Universal Road Machinery Co., of Kingston, N. Y., has located a permanent representative in Harrisburg, Pa., in the person of Mr. James G. Anderson, formerly associated with the Bradley Contracting Co., of New York. Mr. Anderson is a practical machinery man as well as a hustling salesman and will have charge of the development of the Universal Road Machinery Co.'s business in Pennsylvania.

Granite.—The firm of J. Leopold & Co., Inc., Woolworth Bldg., Manhattan, New York, has been incorporated to deal in granite blocks, pavements, etc., and do a general contracting business. Capital, $50,000. Incorporators: J. Leopold, M. L. Schallek, New York, and E. Van Sise, Brooklyn.

New Asphalt Construction Co.—Federal Asphalt Co., 786 Broad street, Newark, N. J. Directors: Rudolph Knoepfl, New York; William H. Masterson, Newark; Henry C. McWhorter, Stelton, N. J.

SOCIETIES.

(Continued from page 257.)

Inquiries and information which has already been received indicate that the coming meeting at Bangor will be the largest attended road convention ever held in New England.

Municipal Engineers of the City of New York.

At the regular meeting of the society, Engineering Societies Building, Wednesday, February 25, a paper entitled, "A Method of Determining or Fixing Time for the Performance of City Contracts for Street Improvements," will be presented by George L. Bennett, efficiency engineer, Board of Estimate and Apportionment. The paper will be illustrated by lantern slides.

Massachusetts Highway Association.

The annual meeting was held in the American House, Boston, February 12. George C. Warren, president of the Warren Brothers Company, gave an address on bitulithic paving and Warrenite road construction, with moving pictures illustrating this kind of work in Massachusetts, Connecticut and New York.

The following officers were elected: Col. William D. Sohier, chairman of the State Highway Commission, president; Louis K. Rourke, vice president; John M. McCarthy of Milton, secretary; Charles A. Brown of Wellesley, treasurer; Richard A. Jones of Walthan, and Edward W. Quinn of Cambridge, directors.

Among those in attendance were Chairman Nelson, of the Maine State Highway Commission; Paul D. Sargent, chief engineer, Maine Highway Commission; A. W. Dean, chief engineer, Massachusetts Highway Commission and division engineers Farrington, Pillsbury, Johnstown and Howes; John R. Rablin, chief engineer Metropolitan park commission; Wallace E. Hassam, president Hassam Paving Co.

American Road Builders' Association.

The annual meeting of the American Road Builders' Association for the election of officers was held at the Hotel Astor, New York, N. Y., Feb. 6. At this meeting the following officers and directors were elected: President, W. A. McLean, commissioner Department of Public Works, Toronto, Ontario, Canada; first vice-president, Geo. W. Tillson, consulting engineer Borough of Brooklyn, New York, N. Y.; second vice-president, A. W. Dean, chief engineer Massachusetts Highway Commission, Boston, Mass.; third vice-president, A. B. Fletcher, highway engineer California Highway Commission, Sacramento, Cal; secretary, E. L. Powers, editor "Good Roads," New York, N. Y.; treasurer, W. W. Crosby, consulting engineer, Baltimore, Md. Directors for three years—Samuel Hill, president Washington State Good Roads Association, Seattle, Wash.; Paul D. Sargent, chief engineer State Highway Commission of Maine, Augusta, Me.; A. H. Blanchard, professor of highway engineering, Columbia University, New York, N. Y.; R. H. Gillespie, chief engineer of highways Borough of the Bronx, New York, N. Y.; Harold Parker, ex-chairman Massachusetts Highway Commission, Worcester, Mass.; Fred E. Ellis, manager Essex Trap Rock & Construction Co., Peabody, Mass.

The reports of the executive committee, the secretary and the treasurer were presented. These reports showed a large gain in the active membership of the association, while the financial condition was found to be very satisfactory. Altogether the work of the association during the past year has been the most gratifying in the history of the organization.

New Jersey Mayors' Association.

The annual meeting of the association, held at Trenton, February 10, decided to urge passage by the legislature of bills providing for a uniform system of municipal accounts, home rule and a number of minor matters. Opposition was expressed to bills giving life tenure of office to building inspectors in second class cities, and the retirement of municipal employees on half pay after twenty years of service. These officers were elected: Frederick W. Donnelly, of Trenton, president; Charles J. Murray, Orange, secretary and treasurer; Mayors Mark M. Fagan, Jersey City; Jacob Haussling, Newark; Julian A. Gregory, East Orange; George Seger, Passaic, and J. M. Fordyce, Paterson, vice-presidents.

North Carolina Municipal Association.

Mayor Bland, president of the association, is planning big things for the annual convention that is to be held at Charlotte May 14-15. One of the features will be a municipal parade, somewhat after the fashion of the big parades in New York and the larger centers. This parade will include in the line of march the firemen and the fire apparatus, the policemen, health department, etc.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION
BIDS ASKED FOR

CONTRACTS AWARDED
ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INFO
			STREETS AND ROADS	
Fla.,	Marianna	Feb. 21.	Constructing hard surface roads	County Commrs.
Pa.,	Bloomsburg	11 a.m., Feb. 21.	Constructing 28,000 sq. ft. wood block paving	Comrs. of Columbia Co.
Mich.,	Bay City	noon, Feb. 21.	Supplying gravel, crushed stone and cement for 1914	O. A. Marsac, Clk., Bay Co.
N. Y.,	Buffalo	11 a.m., Feb. 21.	Work and supplies for grading, opening gutters and surfacing with hard material	F. G. Ward, Comr. Dep. P. W.
Wash.,	North Yakima	Feb. 23.	Paving work	M. A. Gilman, City Engr.
Mich.,	Jackson	10 a.m., Feb. 23.	Constructing gravel and stone gravel road	Road Comrs., Jackson Co.
O.,	Lakewood	noon, Feb. 23.	Paving portions of various streets	N. C. Cotabish, Dir. Pub. Wks.
Ore.,	Eugene	Feb. 23.	Street improvements, cost about $100,000	City Clerk.
Mo.,	Kansas City	Feb. 24.	Macadamizing road	County Clerk.
Cal.,	Sacramento	2 p.m., Feb. 24.	Four miles concrete asphalt highway, and 11½ miles concrete highway	W. R. Ellis, Sec. State H. C.
Ind.,	Ft. Wayne	10 a.m., Feb 24.	Macadam road	C. H Brown, Co Aud.
Minn.,	Crookston	Feb. 24.	Paving 6,527 sq. yds. with Westrumite asphalt	L. Ellington, City. Clk.
Fla.,	St. Augustine	Noon, Feb. 24.	Paving 64 miles; various materials	Clerk of Board.
Md.,	Baltimore	noon, Feb. 24.	Constructing 33.77 miles of state highway	O. E. Weller, Cr. St. Rd. Com.
Mo.,	Independence	Feb. 24.	For macadamizing road	County Hwy. Engr.
N. Y.,	Buffalo	Feb. 24.	Paving portions of several streets	F. G. Ward, Comr. P. Wks.
Tenn.,	Greenville	Feb. 24.	For grading 130 miles of road	H. J. Wisecarber, Sec. Co. Pike Comm.
Md.,	Easton	Feb. 24.	Constructing one mile highway	J. B. Harrington, Clk. Easton Co. Comrs.
Mass.,	Boston	Feb. 24.	Repairing asphalt or bitulithic pavements for 1914	L. K. Rourke, Comr. P. Wks.
Cal.,	Pasadena	9 a.m., Feb. 24.	Street improvement	J. Beyer, Supt. Streets.
Tex.,	Galveston	Feb. 25.	Constructing new county road, 35.2 miles	County Aud. J. M. Murch.
Cal.,	Los Angeles	10 a.m., Feb. 25.	Furnishing creosoted piling	Board of Harbor Comrs., Los Angeles Co.
Ind.,	New Albany	10 a.m., Feb. 25.	Grading, draining and paving 2 roads	T. J. Miller, Co. Aud.
O.,	Findlay	1 p.m., Feb. 25.	Constructing 21,120 ft. of stone pipe, and three similar jobs	J. C. Copeland, Bd. Comrs., Hancock Co.
O.,	Lima	Feb. 26.	Paving with concrete brick, 2 miles	J. R. Marker, Comr., Columbus
O.,	Baltimore	noon, Feb. 26.	Oiling 420 miles of highway with approximately 1,225,000 gals. of oil	State Roads Comm., O. E. Weller, Chr.
Ind.,	Evansville	10 a.m., Feb. 26.	Broken rock and gravel	C. P. Beard, Aud., Vanderberg County.
Kan.,	Topeka	9.30 a.m., Feb. 26.	aving with asphaltic concrete and brick	C. B. Durge, City Clk.
Mo.,	Kansas City	Feb. 27.	Grading, widening and draining roads	County Clerk.
N. Y.,	Albany	1 p.m., Feb. 27.	Road construction and repair in several counties	Comr. J. M. Carlisle.
Minn.,	Carlton	10 a.m., Feb. 27.	Constructing rural highway, 29½ miles, including excavating, bridges, culverts, etc	A. R. Norman, Co. Aud.
Ill.,	Morgan Park	8 p.m., Feb. 27.	Constructing cement sidewalks	F. L. Kimmey, Pres.
Ia.,	Cherokee	8 p.m., Feb. 27.	Paving 42,300 sq. yds	City Council.
O.,	Elyria	1 p.m., Feb. 28.	Furnishing material, grading, draining and macadamizing various roads	Ed. Laird, Eng.
Ill.,	Mattoon	7.30 p.m., Feb. 28.	Constructing 350 lin. ft. concrete curb	C. L. James, Eng.
Ont.,	Sudbury	Feb. 28.	8,240 lin. ft. granolithic sidewalk	W. J. Ross, Town Clk.
Iowa,	Sioux City	Feb. 28.	5 to 8 miles concrete paving	F. C. Smith, City Engr.
O.,	Mt. Vernon	Feb. 28.	Grading, draining and paving with cement, about 9,300 sq. yds.; 6,300 lin. ft. 4-in. drain tile and 6,800 lin. ft. straight curb	Dir. Pub. Serv.
O.,	Ottawa	noon, Feb. 29.	Constructing various stone roads	J. E. Roose, Co. Aud.
Fla.,	St. Augustine	Feb. 29.	Furnishing labor and various materials for paving	I. I. Moody, Ch. Bd. Co. Comrs.
Tex.,	Mineral Wells	Mar. 1.	Macadam road; cost. $55.000	G. S. Steward, Mayor.
N. Y.,	Lockport	Mar. 1.	Improving road, 8.33 miles	Bd. Supervisors.
Mich.,	Port Huron	Mar. 1.	Paving streets with various materials	Clerk of St. Clair Co.
Ill.,	Arcola	Mar. 1.	Various street improvements	A. Schneider, Mayor.
Minn.,	Mankato	Mar. 2.	Grading street	F. W. Bates, City Clk.
Ind.,	Vernon	11 a.m., Mar. 2.	Grading, draining and paving highway	C. J. Bernhard, Co. Aud.
Ind.,	Newport	10 a.m., Mar. 2.	Grading, graveling or macadamizing highway	R. Slater, Co. Aud.
Ont.,	Cayuga	Mar. 2.	Constructing 26½ miles macadam road	T. A. Snider, Co. Clk.
D. C.,	Washington	Mar. 2.	Furnishing and delivering tandem steam roller, 8 tons	O. P. Newman, Ch. Comrs. D. C.
N. J.,	Plainfield	Mar. 2.	Furnishing crushed stone, crosswalks and curbing	City Clk.
N. D.,	Williston	9 a.m., Mar. 2.	Grade and stone fill and placing two 5-foot metal culverts	M. H. Aaen, Aud. Williams Co.
Neb.,	Kearney	3 p.m., Mar. 2.	Paving with brick, asphalt and concrete	T. N. Hartzell, City Clk.
Minn.,	Walker	2 p.m., Mar. 3.	Constructing state rural highway, 23.6 miles long	I. P. Byhre, Aud., Case Co.
La.,	Lake Charles	Mar. 3.	Improving highways, approximately 14 miles	E. C. Hauser, Clk.
Ind.,	Decatur	10 a.m., Mar. 3.	Grading, draining and paving various roads (12 jobs)	T. H. Baltzell, Co. Aud.
Ind.,	Brownstown	2 p.m., Mar. 3.	Grading, draining and paving highway	A. Luedtke, Co. Aud.
Ind.,	Madison	1.30 p.m., Mar. 3.	Grading, draining and paving highway	A. M. Taff, Co. Aud.
Ind.,	Monroe	10 a.m., Mar. 3.	Highway construction with macadam	T. H. Baltzell, Co. Aud.
Ind.,	Kokomo	10 a.m., Mar. 3.	Constructing gravel and brick road	E. B. Swift, Co. Aud.
Ind.,	Paoli	2 p.m., Mar. 3.	Highway construction	E A. Palmer, Co. Aud.
Ind.,	English	2 p.m., Mar. 3.	Grading, draining and paving highway	J B. Emlow, Co. Aud.
O.,	Delta	noon, Mar. 3.	Paving work	A. B. Thomson, Vil. Clk.
Ind.,	Shelbyville	10 a.m., Mar. 4.	Grading, draining and paving highway	F. W. Fagel, Co. Aud.
Ind.,	Muncie	10 a.m., Mar. 4.	Grading, draining and macadamizing highway	F. M. Williams, Co. Aud.
Ind.,	Sugar Creek	Mar. 4.	Improving highway	F. W. Fagel, Co. Aud.
S. D.,	Plankington	Mar. 4.	Constructing 15 miles highway	M. H. Griffin, Ch. Co. Comn.
Ind.,	Washington	10 a.m., Mar. 4.	Grading, graveling or macadamizing highway	Bd. Comrs., Delaware Co.
Mont.,	Plentywood	2 p.m., Mar. 4.	Furnishing 12 road slips, 5 road piles, 1 grader, 1 road drag, 4 4-wheeled scrapers, etc	B. H. Johnson, Clk. & Rec.
Ind.,	Monmouth	10 a.m., Mar. 6.	Grading, draining and paving with crushed stone	C H. Brown, Co. Aud.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
O.,	Cincinnati	noon, Mar. 6	Road improvement (two jobs)	A. Reinhardt, Clk.
O.,	Upper Sandusky	noon, Mar. 6	Grading and stoning waterbound macadam road	J. Marguerat, Aud.
N. Y.,	Albany	1 p.m., Mar. 6	Highway construction in various counties	J. W. Carlisle, Comr.
Wis.,	Racine	10 a.m., Mar. 7	Paving with brick	P. H. Connelly, City Eng.
Pa.,	Scranton	Mar. 9	Constructing improved macadam road	C. P. Savage, Co. Controller.
O.,	Cleveland Heights	noon. Mar. 16	Grading, paving and reconstructing sidewalks	H. H. Canneld, Vil. Clk.
Mont.,	**Billings**	**Mar. 17**	**18,500 yds. of paving**	**L. E. Torrence, City Clk.**
Minn.,	Fergus Falls	2 p.m., Mar. 24	Certain road tools and machinery	W. Lincoln, Aud. of Otter Tail Co.
Ia.,	Atlantic	Mar. 30	Concrete paving, 50,000 sq. yds	E. Nicholas, City Clk.
Wash.,	**Mt. Vernon**	**Apr. 1**	**Constructing 3 miles of highway; cost, about $35,000**	Co. Comrs.
Tenn.,	**Nashville**	**Apr. 1**	**Paving with various materials**	**W. W. Southgate, City Engr.**
S. D.,	**Leola**	**3 p.m., Apr. 7**	**For Galvanized corrugated steel culverts**	**J. B. Whittmayer.**

SEWERAGE

O.,	**Lakewood**	**noon, Feb. 23**	**Constructing brick or vit. pipe sewer**	**N. C. Cotabish, Dir. Pub. Wks.**
Wash.,	Bremerton	Feb. 23	Constructing sewers, estimated cost $16,500	J. C. Adams, City Clk.
Neb.,	St. Paul	6 p.m., Feb. 23	Constructing sewer and outlet	K. C. Rowell, City Clk.
Mass.,	Boston	Feb. 24	C.-i. frames and covers for sewer work	D. F. Doherty, Supt.
O.,	Sandusky	noon, Feb. 24	Constructing sewers in various streets	J. J. Molter, Dir. P. S.
Minn.,	**Kelliher**	**Feb. 24**	**Constructing sewer and disposal plant**	**A. B. Kobe, Vil. Rec.**
Ia.,	**Northwood**	**9 a.m., Feb. 26**	**Constructing 40 miles of tile drain**	**C. N. Urdahl, Co. Aud.**
O.,	Lorain	Feb. 26	Sewer construction	C. G. Ashenbach, Vil. Clk.
O.,	Amherst	noon, Feb. 26	Constructing 6,000 ft. sanitary sewer	C. G. Aschenbach, Vil. Clk.
Mo.,	St. Louis	noon, Feb. 27	Constructing brick and Portland cement mortar sewers	E. R. Kinsey, Pres. B. P. I.
Ill.,	Morgan Park	8 p.m., Feb. 27	Constructing tile pipe sewer	F. L. Kinney, Pres. B. L. I.
Ind.,	Huntington	10 a.m., Feb. 28	Constructing 1 mile ditch	S. V. Hite, Co. Surveyor.
O.,	Mt. Vernon	Feb. 28	Constructing storm sewer	C. N. Williams, Clerk.
Mont.,	**Butte**	**6 p.m., Mar. 1**	**Sanitary sewer**	**W. A. Willis, City Clk.**
Ark.,	**Blytheville**	**Mar. 1**	**Constructing sanitary sewer; cost, $60,000**	**H. C. Houston, Engr., Memphis, Tenn.**
Ia.,	Osage	Mar. 1	Sewer system, 12 miles, $75,000	E. E. Harper, Cons. Engr., 911 Grand Ave., Kansas City, Mo.
Mich.,	Niles	Mar. 1	Four sewers; 5,000 ft. 8 to 24-inch crock tile	M. J. Cleary, Engr., St. Joseph
Cal.,	Los Angeles	Mar. 2	Constructing storm sewer, estimated cost $613,400	Bd. Pub. Wks.
N. D.,	New Rockford	8 p.m., Mar. 2	Constructing septic tank sewage disposal plant	J. K. Burch, Pres. B. P. W.
Ia.,	Ginnell	7.30 p.m., Mar. 2	Furnishing sewer pipe, brick, cement, etc., for one year	City Clerk.
N. D.,	**Grand Forks**	**Mar. 3**	**Constructing pipe sewers; cost, $5,300**	**L. H Lykken, City Engr**
Ind.,	Fort Wayne	Mar. 7	Constructing one mile ditch	C. H. Brown, Allen Co. Aud.
Ia.,	**Garner**	**1 p.m., Mar. 9**	**Constructing drain**	**W. L. Fitkin, Co. Aud.**
Neb.,	Wayne	8 p.m., Mar. 12	Sanitary sewer	J. M. Sherry, City Clk.
Ia.,	Sioux City	Mar. 14	About 5 miles 9-inch vit. pipe sewer	P. J. Wells, City Clk.
Ill.,	Rankin	Apr. 15	Constructing storm and sanitary sewer system	J. W. Shepard, Vil. Clk.

WATER SUPPLY

Ohio,	Kenmore	Feb. 21	Constructing water works	City Clerk.
B. C.,	Oak City	Feb. 23	Furnishing 230 tons of c.-i. pipe	Municipal Council.
Neb.,	Niobrara	Feb. 24	Constructing water works, cost $12,250	G. A. Adams, Vil. Clk.
Minn.,	Hibbing	Feb. 24	For sinking two wells	H. D. Haley, Recorder.
Kans.,	Esbon	Feb. 25	Constructing water works, cost $27,000	B. Chandler, City Clk.
Neb.,	Omaha	Feb. 25	Material for the extension of water system	C. N. Williams, Clk Bd.
Mass.,	Boston	2.30 p.m., Feb. 25	Furnishing 54 tons 36-in. c.-i. pipe, 270 tons 42-in., and 25 tons special castings	Met. Water & Sew. Bd.
Minn.,	Excelsior	Feb. 25	Constructing water works system	H. P. Wistrand, Vil. Rec.
Ill.,	Moline	Feb. 26	Furnishing one 8,000,000-gal. centrifugal pump	C. B. Johnson, Comr. Finance and Accts.
O.,	Mt. Vernon	Feb. 28	For pumping engine	R. B. Howel, Sec. Met. Water Dist
Sask.,	Kerr-Robert	Feb. 28	Constructing water works system	City Secretary.
Quebec,	Lake Megantic	Mar. 1	Constructing dam	Town Council.
Pa.,	Dayton	Mar. 1	Constructing water works, $20,000	R. R. Wilson, Engr., Saltsburg.
Pa.,	Hamburg	Mar. 1	Constructing water system	Dr. S. C. Dixon, Comr., Harrisburg.
Ia.,	Chelsea	noon, Mar. 2	Improving waterworks system, including 15½ tons c.-i. pipe, and 7,149 lbs. special castings, etc	J. Benesh, Twn. Clk.
Que.,	Montreal	Mar. 3	Constructing pumping station, gate house, etc	L. N. Senecal, Sec. Bd. Comrs.
Ill.	Chicago	3 p.m., Mar. 5	Furnishing about 2,000 ft. riveted pipe with fittings	U. S. Reclamation Serv., Federal Bldg.
O.,	Junction City	Apr. 1	Constructing water works, about $16,000	H. L. Maddocks, Engr., Newark.

LIGHTING AND POWER

O.,	**Cincinnati**	**Feb. 23**	**Completing electrical works in school building**	**Board of Education.**
N. J.,	Spring Lake	8 p.m., Feb. 23	Furnishing 25 c.-i. 5-light ornamental lighting posts, with globes and sockets complete, cost $45 per post	E. White, Boro. Supt.
Minn.,	Luverne	2 p.m., Feb. 24	Constructing street lighting system	S. R. Rhera, City Recorder.
N. Y.,	Buffalo	Feb. 24	Conduit and wire for post office	O. Wenderoth, Superv. Arch., Wash., D. C.
D. C.,	Washington	Feb. 24	General alarm bell, 6 electrically operated air compressors and other electrical equipment	J. T. Cowie, Paym. Genl., U. S. N.
Neb.,	Omaha	4 p.m., Feb. 25	Furnishing and erecting a pumping engine	R. B. Howell, Secy. Met. Water Dist.
N. Y.,	Oneonta	Mar. 1	Furnishing street lights	S. M. Close, City Clk.
Pa.,	**Scottdale**	**8 p.m., Mar. 2**	**Furnishing 1,000 ft. fire hose**	**F. M. Newcomer, Sec. Boro.**
N. J.,	Roselle	8 p.m., Mar. 6	Lighting borough with 213 32-c.p. lamps	J. F. Ostrander, Boro. Clk.

FIRE EQUIPMENT

Fla.,	**Key West**	**Feb. 24**	**1 motor fire engine, capacity 700 gals. per minute**	**City Clerk.**
Mich.,	Detroit	Feb. 24	Furnishing 5,000 ft. of hose	Fire Commission.
Mass.,	Pittsfield	Feb. 27	Building addition to fire station	Chief W. J. Shepard.
Minn.,	Mankato	Mar. 2	Furnishing 1,000 ft. 2½-in. cotton rubber-lined hose	City Council.

BRIDGES

Neb.,	Columbus	Feb. 24	Furnishing material and constructing all county bridges for the year	J. Graf, Co. Clk.
Mass.,	**Boston**	**Feb. 25**	**Constructing superstructure of bridge**	**J. F. Merrill, Chr., 1004 Kimball Bldg.**
Ia.,	Sibley	Feb. 25	108 reinforced concrete bridges and culverts	W. A. Burley, Aud. Osceola Co.
Ia.,	Toledo	10 a.m., Feb. 25	Constructing 9 bridges and 13 reinforced concrete culverts	B. W. Posten, Co. Aud.
Neb.,	**Beaver City**	**noon, Feb. 26**	**Constructing steel or concrete bridge**	**J. T. Nickerson, Furnas Co. Clk.**
Ill.,	Chicago	11 a.m., Feb. 26	Constructing super-structure of bridge	L. E. McGann, Com. P. Wks.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Pa.,	Butler	Feb. 27.	Constructing county bridges	W. B. Scott, Clk. Co. Comrs.
Minn.,	Carlton 10 a.m.,	Feb. 27.	Constructing 6 concrete bridges; culverts	A. R. Norman, Carlton Co. Aud.
Ala.,	Mobile noon,	Feb. 27.	Constructing concrete bridge and culvert	H. Pillans, Cityt Comr.
Kan.,	Shawnee noon,	Feb. 27.	Reinforced concrete arch bridge	Bd. of Co. Comrs.
Minn.,	Luverne 1 p.m.,	Feb. 28.	Constructing concrete slab span bridge	J. O. Jacobsen, Chr. Twn. Bd.
N. Y.,	Brooklyn	Mar. 1.	Constructing two concrete bridges	L. D. Morris, Engr., 1965 Broadway, N. Y. City.
Tex.,	Columbia	Mar. 2.	Repairing bridge	J. M. Munson, Co. Judge, Angleton.
Kan.,	Smith Centre	Mar. 2.	Bridge construction and repair work	J. E. Merriam, Smith Co. Clk.
N. Y.,	Eastchester	Mar. 4.	Constructing bridge	H. P. Green, Clk., White Plains
S. D.,	Clear Creek 2 p.m.,	Mar. 4.	Constructing steel and concrete bridge	A. L. Larson, Co. Aud.
Iowa,	Estherville noon,	Mar. 5.	Constructing 3 reinforced concrete bridges	W. H. Gibbs, Chm. Bd. Supv.
Cal.,	San Diego 2 p.m.,	Mar. 5.	Constructing two reinforced concrete bridges	J. T. Butler, Clk.
O.,	Coshocton	Mar. 10.	Reconstructing bridges; cost, $65,000	County Commissioners.
Ind.,	Brookville 11 a.m.,	Mar. 17.	Constructing several bridges	Bd. Comrs., Franklin Co.
Minn.,	Winona 2 p.m.,	Mar. 26.	Constructing 10 concrete culverts; cost, $32,865	C. A. Anding, Co. Aud.
S. D.,	Salem 2 p.m.,	Apr. 7.	Furnishing galv. corrugated metal culverts for the year.	A. E. Ecklein, Co. Aud.
Ore.,	Gold Beach 5 p.m.,	Apr. 9.	Reinforced concrete bridge to cost $35,000	J. M. Caughell, Co. Sur.
			MISCELLANEOUS	
Mich.,	Bay City	Feb. 21.	Furnishing crushed stone, gravel, Portland cement and road oil	O. A. Marsac, Sec. Bay Co. Rd. Comn.
N. J.,	Spring Lake 8 p.m.,	Feb. 23.	Furnishing 10,000 ft. wood, fibre or tile conduit	E. White, Boro. Supt.
N. J.,	East Orange 8 p.m.,	Feb. 23.	Furnishing 3,000 tons 1½-inch trap rock; 3,000 tons ¾-inch; and 2,000 tons broken trap rock screens	L. E. Rowley, City Clerk.
Pa.,	Scranton 8 p.m.,	Feb. 23.	Furnishing 1 gasoline motor truck	E. D. Fellow, Secy.
Mich.,	Saginaw 8 p.m.,	Feb. 24.	Portland cement, sewer pipe, castings, etc., for 1914	City Clerk.
N. J.,	Jersey City 11 a.m.,	Feb. 24.	Furnishing wire, globes, carbons, oil and binder	J. C. Sweeney, Clk.
N. Y.,	New York	Feb. 24.	Furnishing track material	E. E. McCall, Ch. P. S. Co
Pa.,	Allentown 10 a.m.,	Feb. 26.	One gasoline motor-driven truck	C. J. Dilcher, Co. Cont.
La.,	New Orleans	Feb. 26.	Brick building for pumping station	Sewage & Water Board.
Ill.,	Chicago 11 a.m.,	Feb. 26.	Furnishing municipal reduction plant: Dryers, cranes, crushers, generator sets, girders and crane runway, conveyors, fans and motors	G. B. Young, Comr. Health.
Mich.,	Big Rapids 3 p.m.,	Feb. 28.	Constructing post-office	O. Wenderoth, Super. Arch., Washington, D. C.
Ill.,	Chicago 11 a.m.,	Feb. 28.	One car portable railway paving plant	L. E. McGann, Comr. P. Wks.
Tex.,	Kingsville noon,	Mar. 1.	Erecting fireproof court house and hospital	Comrs. Court of Kleburg Co.
N. C.,	Raleigh	Mar. 2.	Erecting court house; cost, $224,000	City Clerk.
Mont.,	Helena 8 p.m.,	Mar. 2.	Two 600-gallon tank street sprinklers	E. J. McConnell, City Clk.
Pa.,	Philadelphia noon,	Mar. 2.	Constructing pier and bulkhead	C. W. Norris, Dir.
N. Y.,	New York	Mar. 2.	Constructing section 4 of new subway	Public Serv. Comn.
N. D.,	Williston 3 p.m.,	Mar. 9.	Constructing post-office	O. Wenderoth, Super. Arch., Washington, D. C.
Ariz.,	Kingman	Mar. 9.	Erecting $70,000 court house	Co. Bd. Supervisors.
Minn.,	Staples 8 p.m.,	Mar. 10.	Constructing a jail	F. W. Findsen, City Clk.
Mo.,	De Soto	Mar. 13.	Constructing post office	O. Wenderoth, Superv. Arch., Wash., D. C.
Ga.,	Bainbridge	Mar. 14.	Constructing post office	O. Wenderoth, Superv. Arch., Wash., D. C.
N. J.,	Camden 8 p.m.,	Mar. 17.	Constructing timber bulkhead	F. S. Van Hart, Ch. Com. Wharves and Docks.

STREETS AND ROADS

Star City, Ark.—About 25 miles of highway will be built. Hugh R. Carter is State Highway Engineer.

Tucson, Ariz.—Committees have been appointed to further movement for good roads in Pima County, and to suggest feasible ideas for drawing up plans which would meet with approval of Board of Supervisors and taxpayers generally.

Fairfield, Cal.—Solano County has agreed to purchase $350,000 worth of State highway bonds. This will assure the beginning of State road through this county by April.

Oakland, Cal.—City Council has directed City Engineer Perry Brown to prepare proceedings for extending and opening Ritchie St. to Foothill Blvd., and adopted resolutions to open and widen Broadway and Webster St., between 25th and 26th Sts.

Red Bluff, Cal.—Chamber of Commerce has adopted resolutions favoring purchase of highway bonds by county.

Sacramento, Cal.—Improvement of U St., from 8th to 21st St., is being planned.

San Francisco, Cal.—Board of Public Works will repave Eddy St. with asphalt.

Yreka, Cal.—The Siskiyou County Board of Supervisors has passed resolutions ordering Treasurer to sell $50,000 worth of State highway bonds.

Melbourne, Fla.—Bond election for street improvements has been carried.

Sterling, Ill.—Oiling of highways in Sterling and Coloma Townships is being discussed.

Waukegan, Ill.—About $193,000 may be expended this year for paving improvements and $4,000 for sidewalks.

Elkhart, Ind.—The Elkhart County Commissioners have ordered 3,080 ft. of concrete highway constructed in Elkhart. The association of cement manufacturers has agreed to furnish engineer to superintend construction free of charge to county. Stretch will be a test to ascertain value of cement roads.

Lafayette, Ind.—Arrangements are being made by city administration to oil various streets of city this summer. Petitions for oiling of streets should be filed with city clerk so that contracts can be let before latter part of April. Streets on which petitions are first filed will be first streets oiled.

Portland, Ind.—Petition asking for improvement of Wayne Township highway, under three-mile road law, has been filed for consideration of Board of Commissioners in March. Road is southwest of this city.

Portland, Ind.—Three bids have been submitted for South Meridian St. improvement and four kinds of brick were bid upon. Bidders were Fitzmaurice & Beard, N. R. Griffith & Frost, Sprinkle & Mannix. Bids as they are submitted are very complicated, but rough figures show Fitzmaurice & Beard to be in neighborhood of $300 low for total improvement. Rough figures for different kinds of block will make contract price for total improvement run about as follows: Fitzmaurice & Beard in Brazil block with combined cement curb and gutter and the sewer complete, $27,182.25; N. R. Griffith on same specifications, $27,331.10, to which must be added 6-in. sewer pipe which is approximately worth $300; Fitzmaurice & Beard on Metropolitan block, combined cement curb and gutter and sewer complete, $27,182.25; N. R. Griffith on same specifications, $27,225.60, to which must be added the approximate cost of the 6-in. sewer, amounting to about $300; Frost, Sprinkle & Mannix taking Metropolitan block as a basis with the combined curb and gutter for the entire improvement bid a sum of about $28,354.65.

South Bend, Ind.—Proposed plan of boulevarding Lafayette St., from Riverside Drive to Monroe St., is being discussed.

South Bend, Ind.—Gravel road bonds amounting to $26,900 for improving the highways of Harris Township have been sold by St. Joseph County to J. F. Wild & Co., of Indianapolis, who offered premium of $395.50.

Emporia, Kan.—Paving bonds in sum of $46,722.40 have been sold.

Great Bend, Kan.—Forest Ave. from Main to Williams St. will shortly be paved as a sample road.

Hutchinson, Kan.—City Commission has formally approved city engineer's plan for improvement of Ave. A west along creek, including design of retaining wall and railing.

Leavenworth, Kan.—At regular meeting of City Commissioners resolutions providing for paving approximately 12 blocks were introduced and placed upon their first reading. Nearly all of this paving will be done in downtown district. Streets to be paved are Sixth St., from Miami to Shawnee; Seventh St., from Kiowa to Miami; Second Ave., from Marshall to Pennsylvania and Oak St., from Seventh to Broadway.

Elkton, Ky.—Petition has been filed in County Court asking that election be held on April 11, for purpose of voting on bond issue of $100,000 to pike the roads in Todd County.

Louisville, Ky.—Twelve ordinances providing for paving of market St., west of 34th St. to Western Parkway, distance of 1¼ miles, with asphalt and vitrified brick gutters, to be paid for by property owners, will be introduced in lower Board of General Council by Board of Public Works. Estimated cost of work is $80,000.

Louisville, Ky.—Board of Work has decided to send to General Council ordinance providing for paving with asphalt of Market St., from 34th St. to Montaine Ferry Park. After Council approves ordinance, letting will be advertised and bids will be receivel for work, which wil cost between $50,000 and $60,000. Street will be handsomely paved, asphalt extending 20 ft. on each side of street car tracks.

Russellville, Ky.—Petition has been filed calling for vote on April 1 on issue of bonds to amount of $300,000 for building pikes in Logan County.

Chesapeake City, Md.—State Roads Commission has announced that it will

build five miles of road between Chesapeake City and Fredericktown.

Pittsfield, Mass.—Board of Public Works recommends appropriation of $100,000 for highway repairs.

Allegan, Mich.—Citizens have voted $10,000 bond issue for paving.

Grand Rapids, Mich.—Bids will be received by City Clerk of the City of Grand Rapids, Mich., up to 3 o'clock p. m., February 16, 1914, for $120,000 4½ per cent. street improvement bonds, dated August 1, 1913. James Schriver is City Clerk.

Duluth, Minn.—County Commissioners will award contracts in March for construction of 18 miles of roads in 7th District; also for culverts and road machinery for year 1914.

St. Paul, Minn.—Board of Public Works has confirmed assessment for opening, widening and extending of Edgerton Road, which is to be developed into link of St. Paul Boulevard system. Bids for physical improvement of thoroughfare will be solicited at early date.

St. Paul, Minn.—Board of Aldermen has concurred in action of Assembly in award of bids for paving material, except in instance of material for University and Prior Ave. paving, contract on this material having been held up by Assembly pending sale of bonds for these improvements.

Hattiesburg, Miss.—Board of Supervisors has authorized County iHghway Commission to advertise for bids on nine additional miles of good roads in Beats 1 and 3 at March meeting of board.

Vicksburg, Miss.—Board of Supervisors of Warren County has engaged as road construction engineer, W. P. Moore, who will at once prepare plans and specifications for 15 miles of county road to be built as test or example. Board will arrange later for further work to be paid for out of proceeds of $300,000 bond issue. It is not yet decided where sample 15 miles of road will be laid off, but it will be selected at this meeting so that work may begin at once.

Omaha, Neb.—County Commissioners have voted to widen and macadamize "loup" road from Florence north along river past Pries Lake and Ponca schoolhouse to point near Calhoun, where it meets Calhoun-Florence Road. Work will be started next spring.

Elizabeth, N. J.—Bids will be received shortly for 50,000 sq. yds. bituminous concrete. Thos. E. Collins is City Engineer.

Millville, N. J.—Commissioners of Millville are about to carry out comprehensive plan of city improvement. Bonds to extent of $35,000 will be sold over counter this month. From proceeds $10,000 will be devoted to development of roads at outskirts of city. Another $10,000 will be used to construct storm sewer along Second St.

Morristown, N. J.—Bond issue is being urged for road work in Morris County.

Newark, N. J.—About seven streets have been ordered paved with kranite, three with bitulithic, two with grouted granite, four with brick and about eight with asphalt. Also large number of streets are being inspected with view of being improved with one of above materials.

New Brunswick, N. J.—Colonel Edward Stevens, State Road Commissioner, has given his approval for repairing of Bonhamtown-Woodbridge Road. County Engineer Fox was directed to prepare plans to be submitted later to Board.

Passaic, N. J.—City Engineer H. J. Harder, of Paterson, has completed his arrangements for survey and plan of elimination of grade crossings on Erie in Paterson, and has stated that approximate estimate of $3,000,000 would be about right.

Passaic, N. J.—Resolution is being considered for advertising for bids for laying sheet asphalt pavement upon Main Ave., east of Erie Railroad; in Brinkerhoff Pl., Mercer St., Hudson St. and Morrisse St.

Paterson, N. J.—In report to Board of Finance City Engineer Harder has submitted following outline of street work to be undertaken this year by Board of Public Works: Main St., from Slater to Weiss Sts., railroad share $4,800, cost $48,000; Market St., from Prospect to Spruce Sts., railroad share $3,400, cost $27,000; Spruce St., from Market St. to Ellison St. extension, railroad share $300, cost $5,000; Arch St., from North Main St. to the Passaic River, cost $6,000; Ellison St., from Straight to East 18th Sts., cost $32,000. These streets will be paved with wood block, of which Public Service Railway Co. will pay for cost of paving within their tracks and 18 inches outside. Pavement removed from other streets will be used as follows: Clay St., $3,500; Braun St., $500; Barclay St., to be paid by county; Martin St., $1,150; Dover St., $1,150; Jefferson St., $1,500; Halpine St., $1,350; Dover St., $1,400; Totowa Ave., $750. Streets to be improved with macadam pavement are listed as follows, together with approximate cost: East 32d St., $400; East 35th St., $400; East 36th St., $400; 17th Ave., $1,450; 18th Ave., $410; East 15th St., $1,000; East 17th St., $2,000; East 19th St., $1,050; East 24th St., $1,000; Sixth Ave., $2,150; Butler St., $1,600; Rayton St., $675; Ramsey St., $1,175; Montgomery St., $925; Lawrence St., $925; Fulton St., $950; Dover and Bond Sts., $1,100; York Ave., $2,200. Included in list submitted by City Engineer Harder is $8,000 for oiling of streets in various sections of city. These streets will be selected by members of Board of Public Works at later date.

Paterson, N. J.—Freeholders will now proceed with making of survey of Paterson and Hamburg turnpike, which is to be improved.

Albany, N. Y.—Bids will be opened by State Commissioner of Highways on March 6 for improvement of about 17 roads; also repair of about 13 roads.

Auburn, N. Y.—Mayor Charles W. Brister has filed with Council memorandum stating that he had approved resolution designating Wall St., from State St. to Aurelius Ave., and Aurelius Ave., from Myrtle Ave. to arch over Owasco outlet, as sections of streets to be paved this year.

Binghamton, N. Y.—Council is considering ordinances for paving of various streets.

Binghamton, N. Y.—Special election will be held March 6 for voting on $25,000 bond issue for paving, repaving, resurfacing and macadamizing. F. M. Hopkins is City Clerk.

Geneva, N. Y.—The J. W. Brennan Construction Co., of Geneva, successful bidders for resurfacing of state road on Canandaigua Turnpike leading from end of brick pavement in Washington St. to dividing line between towns of Geneva and Seneca, has received word that contract for this job would have to be readvertised and awarded.

Geneva, N. Y.—Geneva road contractors have received notice of advertising of another repair job on state road between Geneva and Canandaigua, known as repair contract No. 509. Roads are in village of Canandaigua and between Geneva and Canandaigua, in town of Hopewell. Work includes about six miles of Geneva-Canandaigua turnpike.

Middletown, N. Y. — Engineers are completing survey of road between Monticello and Bloomingburg, and State Highway Department expects to advertise for bids in March.

Niagara Falls, N. Y.—City Engineer Parkhurst is preparing for Board of Public Works set of maps showing streets which are in need of paving, sewers and water mains, with purpose of arranging systematic plan for improvements.

Niagara Falls, N. Y.—At meeting of Public Works Board Engineer Parkhurst submitted estimate of cost of proposed improvement of Buffalo Ave., from 24th St. to Quay. Figures were $118,325.

Oswego, N. Y.—Commissioner of Works Charles W. Linsley will confer with Division Engineer of Highways McDonough regarding highway connections which are to be constructed in this city this year.

Rochester, N. Y.—Resurfacing of State St. has been authorized.

Syracuse, N. Y.—Petitions have been presented for paving Coolidge Ave., from Bellevue Ave. to Cheney St., and for reservation of both sides of University Ave., between East Adams and Marshall Sts., for residential purposes.

Asheville, N. C.—Madison County bonds to amount of $100,000 recently voted for purpose of road improvement, have been purchased by firm of C. N. Malone & Co., of this city.

Greensboro, N. C.—Board of Aldermen has appropriated $1,000 for building of permanent concrete sidewalks in four wards of Lexington.

Mount Airy, N. C.—Good roads bonds in the sum of $80,000 have been awarded to Stacy & Braun, of Toledo, Ohio.

New Bern, N. C.—Carteret County is planning to improve number of its roads and make them among best to be found in Eastern North Carolina.

Bismarck, N. D.—By unanimous vote of County Commissioners Burleigh County has taken great step forward in good road construction. Resolution provides that $8,000 shall be expended this year, from county road fund, on main line of road leading east from Bismarck to Burleigh County line, and $4,000 shall be expended on main line leading north from Bismarck to Wilton, and $2,000 shall be expended in the Fourth Commissioner District. Also proposition has been made that county spend $1,000 per mile for 250 miles of road.

Cincinnati, O.—Resolution has been adopted for paving with brick Rice St. from Tacoma St. to Gage St. L. J. Dawner is President of Council.

Fremont, O.—County Commissioners have decided to accept offer of $30,000 from state highway department on condition that county also put up $30,000, same to be spent on inter-county highway improvement. Commissioners have decided to spend money in construction of brick highway between Clyde and Castalia on Fremont and Sandusky route. three miles of 16-ft. brick road will be put down this summer.

Hamilton, O.—Ordinance has been passed declaring it necessary to improve Greenwood Ave., from Heaton St. to Catholic cemetery by paving roadway with sheet asphalt, vitrified brick, macadam or creosote block.

Lorain, O.—Two engineers have started preliminary survey of proposed lake shore road, which will connect this city with Cuyahoga County.

Mansfield, O.—Resolution presented by Councilman Lanehart to improve Temple Court, from Diamond St. to Franklin Ave., has been adopted. This street will be paved with brick or block and retaining wall will be built along Eberle property.

Sandusky, O.—After much preliminary talk and legislation, Scott St. is to be paved from Columbus Ave. to Hancock St. Street is to be paved with sheet asphalt, tar top macadam or tar top concrete, these being materials specified in improvement ordinance.

Tiffin, O.—Following are improvements decided on: Improvement No. 22—On Fostoria and Fremont Road, ¼ mile in Jackson and ¾ mile in Liberty Townships: Improvement No. 215—Fostoria and Carey Road, ¾ of a mile in Big Spring Township, near Springville; improvement No. 449—North Greenfield Road, between Tiffin and Republic, one mile in Clinton Township; Improvement No. 267—Kilbourne Road, ¾ of a mile in Thompson Township, 1½ miles in Adams Township and ½ mile in Scipio Township. Also gap south of Republic, in Kilbourne Road and in Scipio Township, 1½ miles long and north of Attica and Findlay Road.

Toledo, O.—Petition urging paving of Jackson St. between Summit and Water Sts. with granite blocks on concrete has been received by Council Committee on Public Improvements and referred to City Engineer for plans and estimates.

Youngstown, O.—Paving and widening of Foster St. is being discussed.

Rainier, Ore.—Road bond election to vote on issue of $360,000 has resulted in majority for bonds of 398 votes. Proceeds of bonds to be used in construction of the Columbia highway through Columbia County, from the Multnomah to the Clatsop County lines.

Beaver, Pa.—Joseph W. Hunter, deputy highway commissioner, has declared that instead of building highways of macadam, concrete and brick, it is vastly more important to improve the 88,000 miles of dirt roads in the state which are costing the taxpayers $4,500,000 a year.

Connellsville, Pa.—It is proposed to build seven miles of road this year, apportioned as follows: Dunbar Township, 2 miles; Georges Township, 2¼ miles; Redstone Township, 1¾ miles, and Jefferson Township, 1 mile.

Ellwood City, Pa.—Ordinances have been passed on first reading, covering grading, curbing and paving of Franklin Ave. from the Ellwood Southern Railway to 6th St. Lawrence Ave. is to be paved from 9th St. to 12th St.

Erie, Pa.—Ordinance is being considered for laying out, opening and establishing width of East Ave., Pennsylvania Ave., Dunn St. and Hess Ave. from shore line of Lake Erie northwardly to point in line with north side of South Channel Pier at harbor of the city. M. J. Heney is Clerk of City Council.

Harrisburg, Pa.—Ordinance has been introduced authorizing grading of Brown St. from 17th to 18th St.

Johnstown, Pa.—Street and Alley Committee has been instructed to prepare estimate of approximate number of brick required to pave streets that are to be improved coming summer.

Tionesta, Pa.—Borough Council has been informed that its application for state aid in reconstruction of road from end of pavement at South Elm St. to

Tionesta Creek bridge, has been approved by State Highway Department. Distance is about 1,100 ft.

Wilkes-Barre, Pa.—Ordinance providing for grading, curbing and paving of Coal St., in Third Ward, is being considered.

Newport, R. I.—Widening of 3d St. and improvement of various other streets are being considered.

Sumter, S. C.—City Manager will shortly advertise for bids on Liberty St. paving.

Sumter, S. C.—County Board has decided to construct good road between Shiloh and McBride's Ferry, directly connecting that part of Sumter County beyond Black River and city of Sumter. Another road will also be extended from Shiloh to Trinity.

Nashville, Tenn.—Widening of 8th Ave. is being discussed.

Galveston, Tex.—Provision for adequate sprinkling streets of city, as has been suggester by Merchants' Association, is made in budget recommendations prepared for submission to Board of City Commissioners by City Engineer Dickey, whose requests for street maintenance and improvement amount to $126,080 for new fiscal year. Engineer suggests that automobile street sprinkler be secured at cost of $5,000. It is believed that power-driven vehicle will be most efficient for this work.

Holland, Tex.—Election will be held in district on March 7 to vote on proposition to issue $105,000 in bonds to build good roads. If bonds are voted and roads built there will be continuous graveled pike from McLennan County line on north to Bastrop County line on south.

Houston, Tex.—An additional appropriation of $1,200.34 has been authorized out of general fund for purpose of completing laying of sidewalks around Dow, Crockett and Longfellow Schools.

Houston, Tex.—Advertisements have been published calling for bids for about 2½ miles of sidewalks to be put down in Central Park as soon as work can be done. Howe & Wise, civil engineers, have specifications for work at their offices in First National Bank Building.

San Antonio, Tex.—Council has appropriated $20,000 to widen West Commerce St. and pledged itself to appropriate $55,000 additional in June; $20,000 to widen West Travis St.; $16,000 to open and widen East Houston St.; $3,000 to widen St. Joseph St., and $8,650 to widen Nacogdoches St.

Smithville, Tex.—The $50,000 bridge and road bond election held in this Commissioners' Precinct has been carried by large majority.

Yoakum, Tex.—Election will be held March 18 for voting on issuance of $40,000 for street improvements.

American Fork, Utah.—Twenty streets of American Fork are to be graded and turnpiked, according to decision of City Council.

Ogden, Utah.—Upon recommendation of Commissioner Chris Flygare, City Board of Commissioners have directed Mayor Fell to order new road steam roller at cost of $3,250, less $750 which will be credited on account for old roller. Machine will be delivered in time for spring work. Roller weighs 24,000 pounds.

Salt Lake City, Utah.—See Miscellaneous.

Portsmouth, Va.—Movement is on for establishment of boulevard between Portsmouth, Suffolk and Richmond.

Smithfield, Va.—Appropriation is asked for improvement of highways.

Vienna, Va.—Bids for $50,000 worth of road bonds issued by Mt. Vernon district for improvement of roads in lower Fairfax County have been opened by Fairfax Board of Supervisors. Board allotted $45,000 worth of these bonds to Baker, Watts & Co., of Baltimore, and $5,000 to three Fairfax County citizens —John T. De Bell, of Centerville, and Mr. and Mrs. Bruin, of West End, near Alexandria.

Tacoma, Wash.—City engineer's office and department of public works are making plans for improvement work in streets and public property for this year. Already three street improvements have been ordered by Council.

Appleton, Wis.—Just a mile of paving will be done on Appleton streets during coming summer, according to decision by Common Council.

Appleton, Wis.—The Million Dollar Highway Fox River Valley Association is planning to construct about 70 miles of concrete road from Fond du Lac through Oshkosh, Neenah, Menasha, Appleton, Kimberly, Little Chute, Kaukauna, Little Rapids, Wrightstown, Depere and Green Bay. This road, which is to be built of concrete, is to have a minimum width of 9 ft.

Merrill, Wis.—At recent session of County Board, $1,250 was appropriated for tools to be used by county highway commissioner.

Milwaukee, Wis.—Sixteen new street paving jobs recommended by Commissioner of Public Works and ward aldermen have been provided in ordinances introduced.

Watertown, Wis.—That city of Watertown can obtain paved streets costing $181,000 to construct at actual cost to city itself of but $50,000 and to taxpayers whose property will be benefited, of but $38,500, by voting for bond issue at special election which Common Council set for February 24, has been determined by figures which were secured by City Engineer Earle W. Sayles.

CONTRACTS AWARDED.

Bisbee, Ariz.—At meeting of Board of Supervisors contract for first county road paving was awarded to Bane & Tarrant of Douglas. Pavement will be composed of 5-in. bituminous crushed rock base, with 3-in. bitulithic surface, is 1.95 miles in length and 16 ft. wide and contractors give five-year guarantee. Their bid was $1.95 per sq. yd. Paving will be paid for out of regular county road fund which this year amounts to $105,000.

Sacramento, Cal.—Bids for $570,443 in state highways have been opened by State Highway Commission for construction of various portions of roadway throughout state. Lowest bids were: San Luis Obispo County, Santa Margarita to Atascadero, 8.4 miles, to George S. Benson & Sons, of Los Angeles; bid, $34,784.25; materials furnished by state, $38,551.35; total, $73,335.60. Paso Robles to north county line, 10.6 miles, to W. A. Dontanville, of Pasadena; bid, $46,297.20; materials furnished by state, $46,084.15; total, $107,381.35. Kern County—Lerdo to Famosa, 8.9 miles, to George S. Benson & Sons, of Los Angeles; bid, $24,127; materials furnished by state, $34,597.50; total, $58,724.50. Bakersfield to Lerdo, 10.1 miles, to George S. Benson & Sons, of Los Angeles; bid, $32,161; materials furnished by state, $41,895; total, $74,020. Santa Cruz County—Easterly boundary to Glenwood, 5.7 miles, to Warren S. Foss, of Berkeley; bid, $54,985; materials furnished by state, $6,224.20; total, $61,209.20. Ventura County—Ventura to Sea Cliff, 7.7 miles, to Carl Leonardt, of Los Angeles; bid, $81,544.25; materials furnished by state, $30,060.28; total, $111,604.53. San Bernardino County—Westerly boundary to Upland, 1.7 miles, to Lewis Ferrell, of Pomona; bid, $12,707.98; materials furnished by State, $4,656.07; total, $17,364.05. El Dorado—El Dorado to Placerville, to Arthur S. Lyon, of Smith's Flat; bid, $56,411; materials furnished by state, $10,395.95; total, $66,806.95. Bids for Tulare and Tuolumne Counties were not received.

Hartford, Conn.—Contracts for construction of state road work have been awarded by State Highway Commissioner as follows: Ellington—About 8,150 feet of gravel construction on the Somers road to the A. Vito Construction Corporation, Thompson, for $10,058.70. Danbury, Bethel and Newtown—About 26,200 lineal feet of native stone macadam construction on the Newtown-Danbury turnpike to Joseph Mascetti, Torrington, for $42,722.75. Old Saybrook—About 7,200 lineal feet of gravel construction of the Ferry road to the Connecticut Good Roads & Construction Co., New Britain, for $7,306.30. Franklin—About 3,650 lineal feet of gravel construction of the Hartford-Norwich turnpike to the Bristow Brothers & Knowles Corporation, Narragansett Pier, R. I., for $6,824. Orange—About 22,652 lineal feet of concrete construction on the Milford turnpike to C. W. Blakeslee & Sons, New Haven, for $58,707.

Brazil, Ind.—By Vigo Commissioners, contract to Bowen Construction Co., of Terre Haute for paving of National road east of Terre Haute, to Harrison Township line, for $49,649. Road will be paved on both sides of street car tracks, 16 ft. wide, making total width of 50 ft.

Indianapolis, Ind.—Bids for furnishing asphalt to city asphalt repair plant have been opened by Board of Public Works. Bids were referred to B. J. T. Jeup, city engineer, who will submit recommendations for letting contract in few days. Lowest bid submitted was by United States Asphalt & Refining Co., of New York City, which asked $18 48 a ton for Aztec brand asphalt. Wililam Moore, who represents Barber Asphalt Co., of Philadelphia, submitted only bid for Trinidad asphalt, his bid being $19.90 a ton, with 3 per cent. weight allowance for tare.

La Porte, Ind.—For 17,000 sq. yds. brick paving to (a) Wm. Ahlburn, at $2.10 per sq. yd., and 5,000 sq. yds. to (b) Neil & David, at $1.90 per sq. yd. Total of bids, (a) $43,500, and (b) $8,737.

Laporte, Ind.—W. B. Hutchinson, of Michigan City, and W. F. Smith Co., were successful bidders on Cass, Crumpacker and Carlson macadam roads. Smith & Co. being awarded contracts for Case and Crumpacker roads; total bids $2,300 and $10,905 respectively. Carlson road was awarded to Hutchinson, bid $20,000. Bids ranged from $2,300 to $30,000. About eight miles of roadway will be macadamized and surfaced.

Waukon, Ia.—For 21,150 sq. yds. brick paving to Western Construction Co., Iowa City, at $2.08 per sq. yd., or total of $48,792. Total of other bidders as follows: C. B. McNamara, Dubuque, $52,155; Koenig-Hedlicka, Omaha, $52,422; Dearborn Const. Co., Waterloo, $51,536; Fielding-Shepley, St. Paul, $50,492; Hanlon & Okes, Sioux City, $52,684; Chris Johnson, Oshkosh, Wis., $54,955; and F. H. Hahn, Cedar Rapids, Ia., $50,739. Also to Western Construction Co., for 4,600 lin. ft. of concrete curbing at 45 cts. per lin. ft. J. D. Cowan is City Clerk.

Concordia, Kan.—M. R. Ammerman, a Salina paving contractor, has contract for ten blocks of paving at Concordia. Contract calls for asphalt paving.

Lawrence, Kan.—Contracts for $44,000 worth of paving in city of Lawrence have been awarded by City Council. A. R. Young & Co. were awarded contracts for brick paving and concrete alleys. This contract totals approximately $29,000. It includes work on South Kentucky St., South Vermont St., Ohio St., adjoining the University Club, widening of Winthrop St. from New Hampshire to Massachusetts, and for two alleys. J. R. Ramsey, of Lawrence, was awarded contract for asphaltic paving, the contract totaling $15,000. This work is to be done on the 700 block of Louisiana St. and four blocks in University Pl.

New Orleans, La.—W. E. Gerens, of Remy, La., was lowest bidder at opening bids for construction of gravel and earth roadway, four and one-half miles long, extending from New Iberia to Parish of St. Martin, at $10,176. Other bidders were Lower Coast Construction Co., $10,256.50, and H. J. Bonnabel, $11,756.90. Highway is known as New Iberia-Lafayette road. It was decided to award contract to Mr. Gerens.

St. Paul, Minn.—Contracts for paving material for various streets have been awarded by Council as follows: Market St.—Binder rock, St. Paul Crushed Stone Co., St. Paul, $2 a cu. yd.; asphalt sand, General Contracting Co., St. Paul, $1 a cu. yd.; stone dust, same company, $4.50 a cu. yd.; cement, St. Paul Lime & Cement Co., $1.28 a barrel; concrete sand, Henry F. Smith, 98 cts. a yd. York and Westminster Sts.—Brick paving blocks, Purington Paving Brick Co., $1.06 a sq. yd.; Portland cement, St. Paul Lime & Cement Co., $1.28 a barrel; concrete sand, Allen P. Boyd, 91 cts. a yd.; cushion sand, same company, $1.10 a yd.; crushed stone, St. Paul Crushed Rock Co., $2.25 a yd. Case and Arkwright Sts.—Brick paving block, Purington Co., $1.06 a yd.; Portland cement, St. Paul Lime & Cement Co., $1.28 a yd.; crushed stone, St. Paul Crushed Rock Co., $2.25 a yd.; concrete sand, Allen P. Boyd, 91 cts. a yd., and cushion sand, same company, $1.10 a yd. Hamline Ave.—Portland cement, St. Paul Lime & Cement Co., $1.28 a barrel; paving pitch, Barrett Mfg. Co., 60 cts. per cwt., f. o. b. wagons at plant, or 72 cts. delivered on the street; crushed stone, St. Paul Crushed Rock Co., $2 a yd.; concrete sand, W. H. Malone, $1.20 a yd., and cushion sand, same bidder, same price. Bids for creosoted blocks were rejected.

Raleigh, N. C.—By City Council, contract for paving with concrete, alley between municipal building and Yarborough Hotel, to W. J. Grantham, at 90 cts. per sq. yd. for 489 sq. yds. Other bidders were Climax Concrete Co., $1.15; J. G. Council Co., $1.15; F. H. Hunnicutt, 99 cts.

Jacksonville, Ore.—For construction of 13½ miles of Pacific Highway in Jackson County to J. W. Sweeney & Co., Portland, at $107,000.

Portland, Ore.—For paving East 45th St. to Warren Construction Co. at $16,000; for paving of East 18th St. to Barber Asphalt Paving Co. at $8,033.

Meadville, Pa.—Contracts have been let for paving of five miles, at cost of $161,844.85. Of entire amount, $110,719.41 worth, or contracts A and B, were awarded to George M. Harris of this city. Contract C went to Lawrence Schultze,

of Fredonia, N. Y., at $30,568.64, and contract D went to Thomas McGuigan of this city, at $20,556.80. Specifications named in each contract called for Jamestown block, with curb and gutter with 5-inch base and concrete facing. Contracts are four in number and cover paving in four large sections of the city. Contract A includes South Main, Water and Market Sts.; contract B, Arch, Grove and Liberty Sts.; contract C, State and Washington; and contract D, Race, Terrace, Spring and Prospect Sts.

Pierre, S. D.—State land department has let contract for work on state roads in Marshall County. This contract was for work in Marshall County and will amount in total to about $3,000, the work being at several places. Contract went to Frank Putine, of Langford, at low price of 19 cts. a yard.

Spartanburg, S. C.—At called meeting of City Council it was unanimously decided to go on with street paving work. Following were streets decided on to be paved, number of sq. yds., and price to be paid to Noll Construction Co., of Chattanooga, Tenn.: Alabama St., from East Main to St. John, 2,773.33 sq. yds., $4,-021.33; Spring St., from Hampton Ave. to end of paving, 8,948.75 sq. yds., $12,975.69; South Dean and Union Sts., from East Main to Cudd, 9,103.22 sq. yds., $13,199.79; St. John St., from North Dean to Mrs. Britton's corner, 1,195.22 sq. yds., $1,-733.07; East Main St., end of paving to city limits, 7,184 sq. yds., $10,416.80; South Converse St., Southern Railway to Park Ave., 4,680.89 sq. yds., $6,787.29; Wofford St., from Magnolia to Choice, 2,-020 sq. yds., $4,343; Morgan Ave., from West Main to Pollard, 1,640 sq. yds., $3,-526; Broad St., from end of paving to Morgan Ave., 967 sq. yds., $1,402.15; Howard St., from Milan to Magnolia, 4,978.67 sq. yds., $7,219.07; Advent St., from East Main to Kennedy, 2,232 sq. yds., $3,236.40; Oakland Ave., from East Main to St. John, 3,554.17 sq. yds., $5,153.55; Magnolia St., from Southern Railway to College, 12,224 sq. yds., $5,908; College St., from North Church to Howard, 3,299.91 sq. yds., $4,784.87; West Henry St., from Spring to C. & W. C. Railway, 4,937.83 sq. yds., $7,159.85; North Liberty St., from East Main to Elm, 3,266.33 sq. yds., $4,736.18; North Church St., from end of paving to end of curb, 9,023.11 sq. yds., $13,083.51; South Church St., from end of paving to Columbia Ave., 5,397.33 sq. yds., $7,826.12.

Dallas, Tex.—Street paving contracts amounting to approximately $48,000 have been awarded by Board of Municipal Commissioners, improvements to be on Oakland, Garrett, Munger and Griffin. Contracts as follows: Oakland Ave., Grand Ave. to city limits; contract awarded to the Standard Engineering & Construction Co. of Dallas, lowest bidders; paving to be with Uvalde rock asphalt, as property owners petitioned for; engineer's tabulation of bid, $23,473.52. Garrett Ave., Ross to Live Oak; contract awarded to R. C. Stubbs; paving to be vibrolithic; engineer's tabulation of bid, $12,982.84. Munger Boulevard, west side, between Junius and Reiger; contract awarded to Southern Westrumite Co.; paving to be westrumite; engineer's tabulation of bid, $7,464.05. Griffin St., Elm to Pacific Ave.; awarded to the Texas Bitulithic Co., lowest bidder; paving to be 4-in. creosoted wood blocks; engineer's tabulation of bid, $4,387.

Fort Worth, Tex.—County Commissioners have accepted bid of Crane Brothers for constructing 1 1-10 miles of Smithfield and Randal Mill Road, at cost of $782.12.

Fort Worth, Tex.—For resurfacing Jennings Ave., to Central Construction Co., Lexington, Ky.

Norfolk, Va.—Board of Control has awarded contract to United States Asphalt Refining Company of New York City to furnish 30 tons of asphalt, for use of city engineer's department, at $17.99 per ton. Contract for hardware for water department, amounting to $18.95, was awarded Southern Supply Co.

SEWERAGE

Wilmington, Del.—Members of City Council have agreed to provide money necessary to build proposed sewer to extend from Henry Clay to Rockford. This information will be forwarded to Street and Sewer Department, that body having requested building of sewer. Cost is estimated at $40,000.

Indianapolis, Ind.—Bids for rebuilding Fall Creek interceptor across Fall Creek, near Senate Ave., have been opened by Board of Public Works and referred to B. J. T. Jeup, city engineer, for recommendation. There were four bidders, the Cleary-Kuert Co., the Mansfield Engineering Co., A. J. Yawger Co. and American Construction Co. Each bidder submitted four propositions, according to kind of material to be used and bids ranged from $12,616 to $25,000.

Pittsburg, Kan.—Ordinances and resolutions providing for construction of several sewer laterals are before City Commission as follows: An ordinance apportioning and assessing cost of laying 8-in. tile sewer lateral in sewer lateral district No. 18 main sewer district No.3. An ordinance to construct 8-in. tile sewer lateral in sewer lateral district No. 23, main sewer district No. 3. A resolution for 8-in. tile sewer lateral in sewer district No. 3. First reading of resolution for an 8-in. tile sewer lateral in sewer lateral district No. 27, main sewer district No. 3.

Louisville, Ky.—Board of Works has decided to build small sewer with city force from 26th to 30th St., on Duncan.

Northport, L. I.—Sanitary engineers employed by Village Board of Northport, L. I., have prepared plans for sewage disposal plant and maps have already been delivered to Village Trustees. These plans and specifications are most complete and it is understood that cost of installing plant throughout village will be about $70,000.

Baltimore, Md.—Sanitary contract for lateral sewers to be built under specifications of Sewerage Commission was only contract that created interest before Board of Awards at regular meeting. Six contractors submitted bids for this job, which calls for 23,500 lin. ft. of vitrified sewer pipe 8 ins. to 24 ins. in diameter and 19,500 lin. ft. of vitrified house connections. Contract called for large number of items, and two firms—McCarthy & O'Herron and Gallagher, Boyle & Bryan—were close in bidding.

Rockville, Md.—Erection of sewage disposal plant is recommended.

Pittsfield, Mass.—Board of Public Wks. recommends extension of sewer mains.

Williamstown, Mass.—Engineer Wright of State Board of Health is considering plan for extension of sewer system in future in order that State Board might place its approval on general sewer map which town has had made past summer.

Flint, Mich.—Rejection of bids for sewers on West Fourth St., from Buckham to Beach St., and South Saginaw St. from Thread Creek to Oliver St., and recommendation that work be done by city under direction of city engineer made in report of sewer committee of the Common Council have been adopted.

Flint, Mich.—Plans and specifications for sanitary sewer on Lapeer St., from Eighth to Ninth Sts., which were recently submitted, have been adopted and city clerk authorized to advertise for bids to be received not later than Feb. 16.

Grand Rapids, Mich.—Bids will be received by City Clerk up to 3 p. m., Feb. 16, for $60,000 4½ per cent. sewer construction bonds, dated Aug. 1, 1913. James Schriver is City Clerk.

Millville, N. J.—Bonds in sum of $10,000 will be sold for construction of storm sewer along Second St.

Pitman, N. J.—Public demand for municipal sewer system is growing so strong that special committee of Council will shortly be asked to prepare comprehensive report on project, which engineers who have been over the ground say will cost borough $100,000.

New Hartford, N. Y.—Village Trustees has sold bonds to value of $5,000 to Isaac W. Sherrill, of Poughkeepsie, at $4.85. Bonds were sold for purpose of enabling village to connect its sewers with sewers of District No. 1, to dispose of sewerage into disposal plant, and to obtain half interest in plant.

Niagara Falls, N. Y.—Estimate on about five miles of sewer mains will shortly be submitted.

Oswego, N. Y.—According to estimates of city engineer, extra expenditure of $47,000 will be needed to complete storm water sewer being built under $200,000 bond issue of last year. Sewer will have cost $90,000 when finished.

Oswego, N. Y.—City Engineer Flanigan is working out scheme in co-operation with his assistants and Mr. Linsley, and several sewers will be constructed this year which will fit in well with plans for future permanent improvements. Two or three lateral sewers will be constructed in the 5th and 7th Wards, and commissioner hopes that funds for this will be provided from bond issue which will follow special election to provide funds for completion of east side storm water sewer system. Another expense will be sewage disposal plant, which will cost about $1,500 a year for maintenance.

Syracuse, N. Y.—Construction of sewer in Englewood Ave., from Cortland Ave. to city line, has been ordered.

Wappingers Falls, N. Y.—Engineer H. L. Sterling of Newburgh is preparing plans for sewer and water systems.

Cincinnati, O.—Ordinance has been adopted for sewering of portion of Central Ave. Fred Schneller is Clerk.

Columbus, O.—Councilman Holton has introduced resolution to appropriate $7,-500 for extending and further developing sewage disposal plant.

Allentown, Pa.—Installation of sewerage system is under consideration.

Erie, Pa.—Ordinance has been adopted for construction of 9-in. diameter lateral tile sanitary sewer in Plum St.

Cleveland, Tenn.—Sewer bonds offered some time ago for sale in amount of $75,000 have been sold to Harris Banking & Trust Co., of Chicago, at par, money to be available at once.

Knoxville, Tenn.—The laying of sewer laterals for that section of 10th Ward lying west of 9th St. and connecting with Third Creek sewer, will be taken up by John W. Flenniken, Commissioner of Streets and Public Improvements, within next 30 days

Houston, Tex.—Elaborate drainage plan is mapped out by City Engineer; about $400,000 will be spent at once.

Milwaukee, Wis.—Bonds in sum of $550,000 for sewerage improvements will be issued shortly.

CONTRACTS AWARDED.

Kingsburg, Cal.—To C. D. Vincent of Oakland for sewer system with exception of the septic tank, at $13,596, to include 830 ft. of 12-in. pipe, 4,800 ft. 10-in., 8,720 ft. 8-in., 30 flush tanks, 35 manholes, 14 lamp holes and 2,600 ft. outfall pressure line. Johnson Bros. are said to have secured contract at $3,800 for septic tank.

Oakland, Cal.—Contract for sewer in Anita St. northeasterly from Beck St. has been awarded to Heafey & Tobin.

Tampa, Fla.—Board of Public Works held special session to receive special report of Engineer Alexander Twombley on bids put in by some 17 contractors for construction of new Imhoff septic tank system of sewage disposal, which city is to build. Bids, except in one instance, were for sections of work, there being nine sections in all, or one for each ward, save the Tenth. It was shown by letting contracts in each ward to lowest bidder system can be built for $618,-968.13. But one firm, that of Sullivan & Greeson, bid on entire proposition as a whole. It is probable that board will at a special meeting to be held next week, let contracts. Lowest bidders, and who are likely to get contracts, were, by sections, as follows: Section 1, $58,800, Sullivan & Greeson, seven bids; Section 2, $17,900, Sullivan & Greeson, five bids; Section 3, $28,413, Sullivan & Greeson, four bids; Section 4, $33,500, Edwards Const. Co., four bids; Section 5, $120,-728.88, Sullivan & Greeson, seven bids; Section 6, $110,274.35, McNeil, Davis, Webb, four bids; Section 7, $81,166.75, McNeil, Davis, Webb, five bids; Section 8, $136,751.50, McNeil, Davis, Webb, five bids; Section 9, $31,433.25, McNeil, Davis, Webb, five bids; grand total, $618,968.13. Tenth Ward had no been included in original bids. Board has decided to advertise at once for bids on work in that section, and these bids will be opened next week and contract let at same time.

Chicago, Ill.—By Board of Local Improvements for adjusting sewer manholes and catch basins, constructing and connecting catch basin inlets, constructing new catch basins, complete, curbing with sandstone curb stones, etc., on Monticello Ave., to Ryan Co., and on Pratt St. to Peter J. O'Brien.

Peotone, Ill.—For constructing sewer system, by Board of Local Improvements, to John Grogan, Green Bay, Wis., as follows: 1,336 ft. 36-in. pipe sewer, $3.50; 1,810 ft. 30-in., $2.70; 3,140 ft. 24-in., $2 (all in double strength); 1,680 ft. 18-in. tile pipe, $1.15; 1,220 ft. 15-in., 80 cts.; 6,310 ft. 12-in., 70 cts.; 15,720 ft. 10-in., 54 cts.; 103 brick manholes, each, $30; 200 catch basins, each, $35; total, $42,992. Totals of other bids: Katz Constr. Co., Omaha, Neb., $47,820; W. F. Brent, Hammond, Ind., $51,945; Wm. Heggie, Joliet, $48,733; Foley Constr. Co., $47,823; Jacob Althouse, St. Louis, Mo., $53,063; Embankment Co., Joliet, $52,837. L. K. Sherman Co., 3046 West 36th St., Chicago, secured contract for concrete bulkhead and settling tank, at $1,170. Plans by C. N. Roberts of Chicago.

Alden, Ia.—By City Clerk for constructing 11,635 ft. sewers to Dearborn Construction Co., Waterloo, at $12,618. Other bids as follows: Blackhawk Construction Co., waterloo, $14,564; Western Construction Co., Iowa City, $13,898; Sweeney Bros., Reedsburg, Wis., $14,873; Inter-Mountain Bridge & Construction Co., $14,966; W. D. Yeager Co., Iowa City, $15,223; Briggs & Corey, Shenandoah, $15,459; Ole Johnson, Alden, $15,648; Wm. Danforth, St. Paul, Minn., $18,680; Wilmar Cook, Dubuque, $19,050. Blackhawk Construction Co. secured contract for disposal plant at $1,000.

Pittsburg, Kan.—To Tom L. Green, contract for laying sewer lateral in sewer lateral district No. 21, main sewer district No. 3. His bid was $845.

Topeka, Kan.—Contract for Sewer District No. 36 in Skene's Park has been awarded by City Commission to C. A. Jackson, who presented only bid below estimate of city engineer. Work will begin as soon as materials are secured, and will cost city $3,347. Plans of City Engineer Young were accepted. Other bidders for contract were the Kaw Paving Co., John S. Herington, W. S. Fulton, C. F. Gustafson and F. M. Spencer.

Louisville, Ky.—Bids on section 2 of Chestnut St. sewer have been considered by Board of Public Works preparatory to awarding contract for work, which will probably go to Edwin S. Larson, of Louisville, lowest, with bid of $31,704.90. Sewer contained in contract will be a mile long and from 15 to 48 inches in diameter. Its general direction is down Chestnut St., from 34th to alley north of Chestnut St., and then to and through Garr's lane. Other bidders and their bids were: J. H. Cahill, $33,949.68; L. W. Hancock, $34,456.60; Henry Bickel, $40,453.65, and George M. Eady, $44,-237.30.

Flint, Mich.—For construction of sewer on Grand Traverse St., to A. H. Prange, of Flint, at following bid: 14c. per ft. for 12-in. sewer pipe; 17c. per ft. for 15-in. sewer pipe; 20c. per ft. for 18-in. sewer pipe; 24c. per ft. for 20-in. sewer pipe; 30c. per ft. for 24-in. sewer pipe; $1.50 per ft. for 27-in. sewer pipe; 60c. per cu. yd. for excavation; $40 each for manholes; $40 each for catch basins; $40 for 27-in. standard outlets, and $2 per sq. yd. for relaying brick pavement, or approximate sum of $4,786.98.

St. Paul, Minn.—Contract for Woodlawn-Fairmount sewer system has been awarded to firm of Preston & O'Neill, contract price being $83,400, and final orders were passed for Hamline-Jefferson, Dale St. and other sewer systems.

Springfield, Mo.—For constructing sewers as follows: (a) sewers in District 2 of Section 5, about 17,500 ft. 8 and 10-in. pipe; (b) in District 33 of Section 2, about 6,000 ft. 8 and 10-in. pipe: To Plummer & Adams, Springfield, (b) $26,-674; Ralph McSweeney, Springfield, (a) $6,518. C. E. Phillips, City Engineer, is in charge of work.

Altoona, Pa.—For construction of sewer in 22d Ave., to W. W. Saupp Co., at $1.28 for 8-in. sewer and $1 for 6-in. branches if done in winter time, and $1.20 and 98 cts. per ft. if done in summer.

Erie, Pa.—To American Sewer Pipe Co., Akron, O., for carload of conduit pipe.

Fort Worth, Tex.—After tabulating and inspecting bids for resurfacing Jennings Ave. and for extending storm sewer along that thoroughfare, City Engineers found that J. F. Mills & Co. had submitted lowest bid for building the storm sewer and Central Construction Co., Lexington, Ky., the lowest bid for resurfacing streets. Cost for completing the two contracts will be $6,462.

Niagara Falls, Ont.—By City Council to Louis Sacco, of Niagara Falls, contract for installing surface drainage sewer at west end of city, for which by-law was carried at municipal elections in January at $4,006.

WATER SUPPLY

Hartford, Conn.—Water Board has approved plans of the Nepaug dams. The chief engineer, Caleb M. Saville, has been authorized to proceed with details preliminary to setting time for calling for bids.

Alton, Ill.—W. B. Rollins, of the firm of Rollins & Westover, consulting engineers, of Kansas City, is taking plot of town preparatory to making set of blue prints, which will be used in matters pertaining to installation of proposed water works system and electric light plant.

Waukegan, Ill.—About $1,000 may be expended this year for water mains.

Lawrence, Kan.—Ordinance has been passed called special bond election on March 10 for voting on purchase of property of Lawrence Water Co. for $197,000.

Taylorsville, Ky.—Town board has accepted bid of Cotter, May & Co., of Chicago, for 20 waterworks bonds of $450 each.

Haverhill, Mass.—Petition has been filed with water board asking for extension of water main along Boston road in Ward Hill district.

Lowell, Mass.—Installation of filtration plant is being considered.

Mansfield, Mass.—It has been estimated that cost of proposed reservoir for water supply district on Foolish Hill, cost of piping to Foxvale and new pumping engine and boiler at pumping station, would be nearly $45,000.

Detroit, Mich.—Bids will be received until 3 P. M., Feb. 17, for $500,000 of 4 per cent 30-year water bonds.

Vicksburg, Miss.—Board of Mayor and Commissioners have decided to adopt ordinance providing for $400,000 bond issue for construction of water works plant to be owned and operated by city. Bond issue was duly authorized by special election.

Asbury, Park, N. J.—Council is inspecting city water pumping station to ascertain needs of equipment which Water Chairman Hancock has been urging. Mr. Hancock declares new compressor must be installed and that new pipe lines from boilers, etc., are imperative. He estimates that work will cost $15,000.

Keyport, N. J.—Expenditure of $11,-592.75 has been authorized to be made upon municipal water plant to increase its capacity to point where it will adequately supply needs of borough. This amount was estimated by Gustave Voelcher of Matawan, an engineer, to be necessary. Engineer Voelcher was employed to prepare plans and specifications for carrying out his recommendations, which were as follows: Construction of two filter beds, isolated by asphalt cast between brick work at cost of $4,300; construction of clear water basin, capacity 40,000, at cost of $1,175; installation of duplex air compressor to cost $1,500; installation of 100 H. P. R. tubular boiler to cost $1,475; extension of boiler room at cost of $400.

Rahway, N. J.—For installation of better sedimentation system at municipal water plant, for which the Board of Water Commissioners has been planning for past year, board has voted a $26,000 bond issue. Board has had expert engineer, N. S. Hill studying conditions of local water supply and plant during past year in order to become familiar with all its phases. Plans are now ready for system that will be adequate to meet growing demands of city for years to come.

Buffalo, N. Y.—Mayor has given his approval to Common Council's action directing Commissioner of Public Works to draw up plans and specifications and advertise for bids for water sterilization plant employing one of chlorine methods.

Buffalo, N. Y.—Finance Committee of Aldermen have voted to recommend bond issues aggregating $700,000, of which $500,000 is needed, according to Commissioner Ward, for improvements projected by Water Bureau. Commissioner Ward told committee that $500,000 should be made available for these improvements: Laying of mains from new pumping station to city system, $100,000; laying mains to new water towers at Doat and Dole Sts., $200,000; new construction account, $100,000; construction of plant for treatment of water at intake pier and at pumping station, $100,000. If these improvements are authorized by Common Council and approved by Mayor, cost of new pumping station system will be about $7,000,000.

Lyons, N. Y.—Board of Village Trustees have called special election for March 3 to vote upon proposition of acquiring plant of Lyons Water Works Co. for $25,000.

Niagara Falls, N. Y.—Estimate on about five miles of water mains will be submitted to Water Board shortly.

Schenectady, N. Y.—Superintendent McWilliams of Water Bureau has announced that tentative designs for proposed Bevis Hill storage reservoir are nearly complete, and that matter would probably be submitted to Council at its next meeting. Plans afford two possible solutions of problem of water storage which has been under discussion for some time. One provides for construction of 15,000,000-gallon reservoir with ultimate addition of another unit of same size, while second plan calls for construction of two 10,000,000-gallon units at once with ultimate addition of third of same size.

Syracuse, N. Y.—At meeting of Common Council ordinance will be introduced directing purchase of $50,000 worth of outstanding water bonds, funds to come from Water Bureau surplus.

Wappingers Falls, N. Y.—Engineer H. L. Sterling of Newburgh is preparing plans for water and sewer systems.

Asheboro, N. C.—Town Commissioners have issued $20,000 in bonds for construction of water extension. This extension is pipe line to Long Branch, to west of town, where 10-ft. dam will be constructed, giving a 3,000,000-gallon head of water and a 500,000-gallon daily supply for town.

Hubbard, O.—Ordinance will be considered for sale of additional water works bonds to amount of $5,000.

Niles, O.—Ordinance has been passed for purpose of extending and improving water works system.

Charleston, S. C.—Fire Chief Louis Behrens recommends extension of various water mains.

Greenville, S. C.—It is probable that city of Greenville will in near future begin active negotiations with Paris Mountain Water Company looking to purchase by city of local water works, with view to operating it as municipal enterprise.

Austin, Tex.—New waterworks system is to be constructed at Longview.

Salt Lake City, Utah.—See Miscellaneous.

CONTRACTS AWARDED.

Los Angeles, Cal.—By Dept. Pub. Service, to U. S. Cast Iron Pipe & Fdy. Co., for furnishing 1,761 tons standard bell and spigot cast-iron water pipe, at about $53,581.

Wilmington, Del.—By Levy Court contract for laying of 20-in. water main across Christiana River at Third St. bridge to Atlas Bridge Co., at its bid of $2,490 for laying main under Christiana Park and $1,950 for changing main under Christiana River.

Chicago, Ill.—By Bd. of Pub. Wks. to Wm. A. Pope, 29 N. Clinton St., at $26,974, for furnishing and installing at the Roseland Pumping Station, on foundations prepared by city, 2 horizontal centrifugal pumps, driven by direct-connected horizontal condensing steam turbines, with all appurtenances, etc Other bidders: L. K. Sherman, W. 37th St., Chicago, $28,035; H. R. Worthington, Old Colony Bldg., Chicago, $30,000; Camden Iron Works, Philadelphia, $32,000, and Allis-Chalmers Co., Milwaukee, Wis., $34,700.

Lafayette, Ind.—To Wallace Bros. Co., for work at city pumping station, at $2,300.

Carlisle, Ky.—By Mayor and Council, for constructing municipal water works, as follows: To Mathias & Rogers, Carlisle, dam and reservoir; Belknap Hardware Co., Louisville, pumps and motors; American Cast Iron Pipe Co., Birmingham, Ala., cast-iron pipe and castings; Rensselaer Valve Co., Troy, N. Y., valves, hydrants and boxes; Chicago Bridge & Iron Works, Chicago, Ill., tank and tower. S. C. Vaughn is City Clk.

Boston, Mass.—For 3,350 tons 6 to 20-in. pipe to the Florence Iron Works, of Florence, at $20.79 per ton, and special castings $55 per ton. Other bidders: (a) pipe, (b) castings. U. S. Cast Iron Pipe and Foundry Co., (a) $21.90, (b) $50; Standard Cast Iron Pipe and Foundry Co., (a) $22.70, (b) $55; Warren Foundry and Machine Co., (a) $21.50, (b) $55.

Norfolk, Va.—By Board of Control, to Lynchburg Foundry Co., of Lynchburg, Va., contract for 400 lin. ft. of 8-in. cast iron pipe for use of engineer's department, at $22.50 per net ton. Other bidders were M. J. Drummond, at $25.50, and J. D. Westbrook Co., at $24.50 per net ton.

Seattle, Wash.—For laying of water mains on Alki Ave., to T. Ryan, at $26,164.87.

LIGHTING AND POWER

Glendale, Cal.—Harry B. Lynch, manager of municipal electric light plant, will secure bids for ornamental electroliers for five-lamp clusters to be erected on Brand Boulevard.

Washington, D. C.—Plans for installing with as little delay as possible new lighting system in downtown section of Washington between Pennsylvania Ave., G, 7th and 15th Sts. are being considered by Walter C. Allen, District Electrical Engr.

Melbourne, Fla.—Bond election for electric lighting system has been carried.

Alton, Ill.—W. B. Rollins, of Rollins & Westover, consulting engineers, of Kansas City, will prepare plans for installation of proposed electric light and water works system.

Malta, Ill.—Committee will make investigations relative to installation of electric light system.

Sheldon, Ill.—Installation of municipal electric light plant is said to be under consideration.

Sterling, Ill.—Extension of boulevard light system to 4th Ave. is being considered. Election will be held for voting on same on March 19.

Minden, Ia.—Town has sold electric light and power plant bonds to George B. Bechtel Co., of Davenport. Engineer is now engaged in getting out plans and specifications for plant and will have them ready for advertising for bids on construction within few days.

Pittsburg, Kan.—Petitions have been presented asking for installation of pedestal illumination system on Broadway and cross streets.

Princeton, Ky.—Movement has been started for erection of electric light plant to be owned and operated by city.

Grand Rapids, Mich.—The Ways and Means Committee has acted favorably upon request of Madison Square Board of Trade for boulevard lights. City will furnish current and string necessary wires, while Board of Trade will purchase standards.

White Sulphur Springs, Mont.—Municipal improvements to cost about $100,000 will be made, including installation of ornamental street-lighting system, cement sidewalks and sewer system. The Gerharz-Jaqueth Engineering Co. of Billings will take charge of the work.

Trenton, N. J.—Board of Public Utility Commissioners has approved ordinance of Common Council of Phillipsburg granting franchise to Phillipsburg Light, Heato & Power Co.

Corning, N. Y.—Requests have been made for additional street lights.

Niagara Falls, N. Y.—Resolution will be presented at meeting of Board of Public Works to readvertise for bids on street lighting on two-year contract, with option of one year additional, and that figures be asked only for old style arcs.

Benson, N. C.—Charter has been granted for Benson Electric Light Co., of Benson, Johnston county, capital $50,000 authorized and $5,000 subscribed for providing electric lighting plant for town of Benson. Incorporators include W. S. Murchison, A. B. Hudson, and others.

High Point, N. C.—The "white way" will cost $5,000 for Main St., in High Point, according to report submitted to City Council by Mayor Tate.

Erie, Pa.—Approximately $50,000 will have to be expended by city for construction of conduits in State St., which will result in removal of wooden poles, City Engineer Briggs have estimated. Conduits for carrying wires will extend from Second to 18th Sts.

Hanover, Pa.—Placing of lighting standards on York St. is recommended.

New Castle, Pa.—City Engineer Milholland is preparing plans for a Tungsten lighting system.

Sharon, Pa.—New method of lighting Sharon with smaller lamps will be decided upon at meeting of council. Several propositions have been put before solons and they will probably make choice.

San Antonio, Tex.—City Electrician Convers is now preparing plans and specifications, including estimate of cost, of luxolabra white way to be installed on Houston St., between North Flores and Alamo Plaza.

Salt Lake City, Utah.—See Miscellaneous.

CONTRACTS AWARDED.

DeGraff, Minn.—By Village Council for electric light equipment to German Electric Co., St. Paul, at $3,154.

Butte, Mont.—By City Council, to Montana Power Co. of Butte, contract for installation of new ornamental street-lighting system. Contract calls for 306 General Electric 6.6-amp inverted magnetite arc lamps, erected on ornamental posts, maintained with underground wires, to cost $31,125. M. J. Flood is City Engineer.

Gainesville, Tex.—City Council has signed contract with Texas Power & Light Co. for lighting streets here for five years. Arc lights now in use will each be supplemented with three Mazda lamps, improving the lighting.

FIRE EQUIPMENT

Bridgeport, Conn.—Fire Commissioners are urging purchase of three tractors.

Salem, O.—Motorizing of fire department is being discussed.

Hartford, Conn.—Sum of $125,000 is asked for motorization of fire department.

Jacksonville, Fla.—Five bids are being considered by fire committee. They are as follows: Robinson Fire Apparatus Mfg. Co., St. Louis, $9,000; The Ahrens-Fox Fire Engine Co., Cincinnati, $10,000; American LaFrance Fire Engine Co., Elmira, N. Y., $9,000; The Seagrave Co., Columbus, O., $9,250. The James Boyd & Bro. Co., of Philadelphia, made two bids, certain differences being made in exact specifications named in each of two bids. One bid was for $8,000 and the other for $8,650.

Marysville, Kan.—City Council has decided to purchase motor combination wagon. George T. Mohrbacher is chief.

Louisville, Ky.—New 55-ft. motor city service truck equipped with 40-gal. chemical tank may shortly be purchased. Timothy Lehan is chief.

Duluth, Minn.—Chief Joseph Randall recommends in his annual report purchase of fire boat, aerial truck, tractors for two engines, one motor ladder truck, one motor combination chemical and hose wagon, one chief's auto and about 3,000 feet of hose.

Jersey City, N. J.—New fire house will be erected in lower section of city.

Jersey City, N. J.—Petition for better fire apparatus in Bergen section is being considered.

Millville, N. J.—Commissioners will purchase combination hose and chemical automobile apparatus for fire department. Alarm system will be extended.

Newark, N. J.—Bids will be advertised at once for 10,000 ft. of hose. Fire Commissioners have petitioned for appropriation of $20,000 with which to purchase additional motor apparatus. Paul J. Moore is chief.

Roselle, N. J.—Provisions for more adequate headquarters for fire department and motor apparatus have been discussed and preliminary plans begun at meeting of Borough Council.

Cooperstown, N. Y.—Proposition is being considered for installation of telegraph fire alarm system.

Mechanicsville, N. Y.—Howland Chemical Company No. 5 has instructed its committee to buy chemical motor truck, following report on prices at last meeting. Report on chemical apparatus installed at Whitehall was read.

Syracuse, N. Y.—The new budget probably will include provision for central telephone alarm switchboard to be connected with fire alarm system.

Syracuse, N. Y.—Appropriation is being considered for purchase of additional motor apparatus. John P. Quigley is Chief.

Hamilton, O.—Purchase of motor trucks for fire department is being considered.

Toledo, O.—Ordinance has been passed authorizing purchase of motor-driven fire apparatus at cost of $200,000.

Connellsville, Pa.—According to plans of fire protection committee, council will be asked to buy two-wheeler truck equipped with two chemical tanks and ladders.

Darby, Pa.—Darby Fire Patrol is making plans for new two-story fire house on lot at Moore and Chestnut Sts.

East Conshohocken, Pa.—Business men of East Conshohocken have already subscribed $11,500 of $8,000 being raised by Washington Company to purchase automobile fire apparatus.

Erie, Pa.—John C. Dundon, head of Safety Department, asks council for $171,288 for new motor apparatus for fire department, and expenses for coming fiscal year. Purchase of 85 ft. aerial motor-driven hook and ladder truck is especially urged.

Glenside, Pa.—Three suburban volunteer fire companies in section immediately north of Philadelphia are planning to spend $22,000 in purchase of motor-driven fire-fighting apparatus. Three sections are: Doylestown, Glenside, in the York road section, and Conshohocken, in the Schuylkill Valley district.

Meadville, Pa.—Bids will be advertised at once for erection of new central fire station.

Scranton, Pa.—In special message to Council, signed by Mayor Jermyn and Director Derby, apparatus for fire department to amount of $45,000 is asked and at same time it is estimated that by purchasing this apparatus city will save $31,230 in various amounts and will be able to sell present apparatus for approximately $12,900. Amount of apparatus asked for includes: Two tractors for steam engines, $7,000; three triple pieces, $21,000; two combination chemicals, $10,000; one aerial truck, $7,000; total, $45,000.

Charleston, S. C.—Fire Chief Louis Behrens has made following recommendations: Purchase of one motor triple combination pump, 750-gallon capacity; chemical and hose truck, to be located at Engine House No. 6. That fire alarm system be further extended in western section of city known as Hampton Park Terrace. That red light be placed at each fire alarm box. That one of the fire tugs of marine division of department be equipped with one Morse Invincible nozzle of 1,100-gallon capacity. The aerial truck, located at the central station, be sold or exchanged in part payment for new motor-drawn seventy-five-foot aerial hook and ladder truck.

Knoxville, Tenn.—An auto chemical fire engine will be asked for.

Burlington, Vt.—Purchase of motor ladder truck, 1,000 feet of hose and alarm equipment has been recommended by Chief C. A. Niles.

Puyallup, Wash.—Purchase of motor combination chemical and hose wagon is recommended by Chief L. E. Asher.

CONTRACTS AWARDED.

Lakewood, N. J.—To Empire Rubber & Tire Co. of Trenton, N. J., contract for 400 feet of 2½-inch hose at 80 cts. per foot.

Yonkers, N. Y.—For furnishing one motor aerial truck and one motor pumping engine, to American La France Fire Engine Co., Elmira, N. Y., at its bid of $11,500 for former and $8,750 for latter.

Wilkes-Barre, Pa.—Contract for switchboard for police and fire alarm systems has been awarded to Gamewell Fire Alarm Co., New York City for $2,675.

Providence, R. I.—Board of Contract and Supply has given Fire Commission authority to purchase one La France and one Pope automobile fire truck, for use in department.

Seattle, Wash.—By Board of Public Works, for fire apparatus, as follows: Two combination motor fire engines, American-La France Fire Apparatus Co., A. G. Long, agent, $18,000; two combination motor fire engines, "Seagraves," Gorham Fire Apparatus Co., $18,000; two tractors, Pacific Coast Fire Supply Co., $9,000.

BRIDGES

Hartford, Conn.—Need of modern bridge on Capitol Ave. over Park River is being discussed.

Waterbury, Conn.—The Brooklyn Bridge bond issue of $25,000 has been sold by Board of Aldermen to highest bidders, Harris, Forbes & Co., of New York, who offered $26,297.75. Twelve bids in all were received.

Streator, Ill.—Revised plans for new Vermillion River bridge, on road to Deer Park, have been completed in office of State Highway Engineer.

Indianapolis, Ind.—Board of County Commissioners has announced it will readvertise for bids on 120,000 ft. of oak flooring for bridges.

Manhattan, Kan.—Harvey County Commissioners will construct five concrete bridges of latest improved type, under direction of State Highway Engineer W. S. Gearhart, at Kansas Agricultural College.

Salina, Kan.—County Commissioners have adopted resolution calling for appropriation of $26,000 for construction of reinforced concrete bridge across Smoky Hill River on Iron Ave., provided city of Salina appropriates like amount.

Schenectady, N. Y.—Plans are being discussed for bridge for foot of Governor's Lane to Glenville end of present bridge.

Amsterdam, N. Y.—Although at taxpayers' election last spring it was decided to issue bonds in amount of $100,000 to construct new bridge across Mohawk River, this amount being deemed amply sufficient, it is found that city will have to raise $25,000 additional for erection of this structure.